(No Model.) 5 Sheets—Sheet 1.

W. W. TUCKER.

HUB BLANK MAKING MACHINE.

No. 527,907. Patented Oct. 23, 1894.

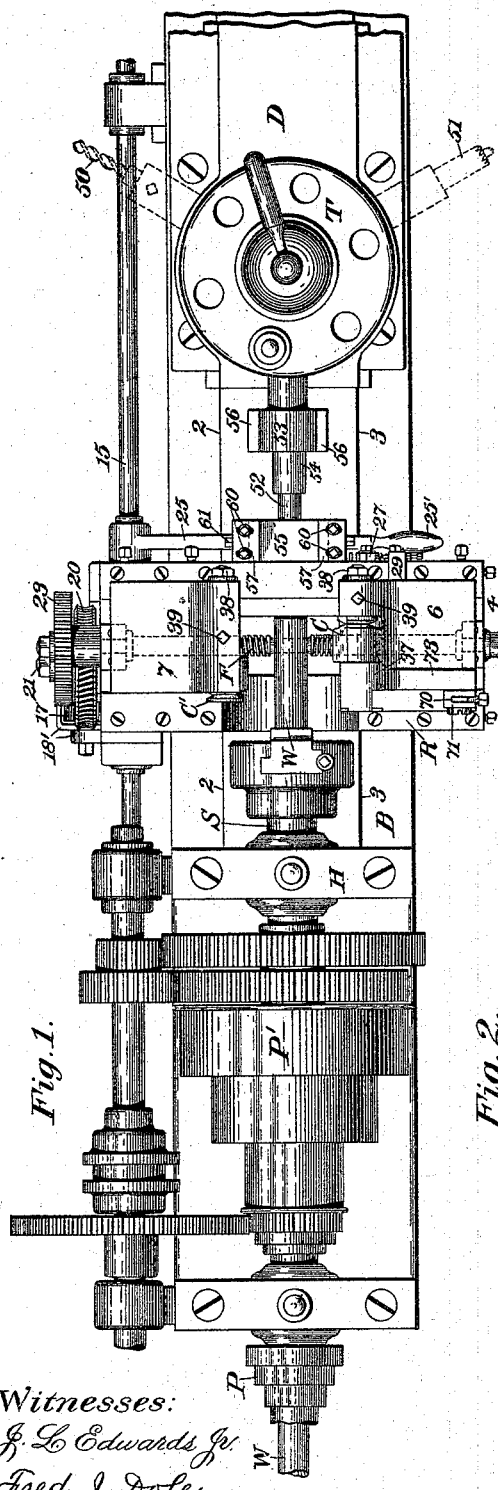

Fig. 1.

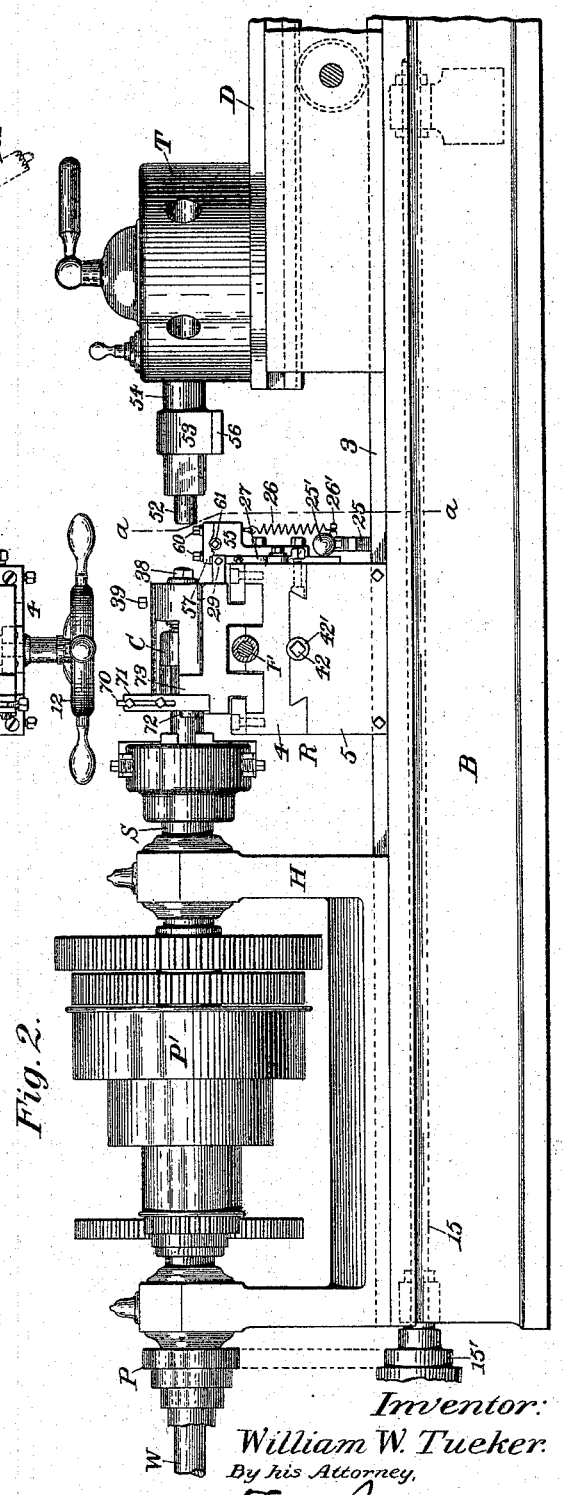

Fig. 2.

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Fig. 3.

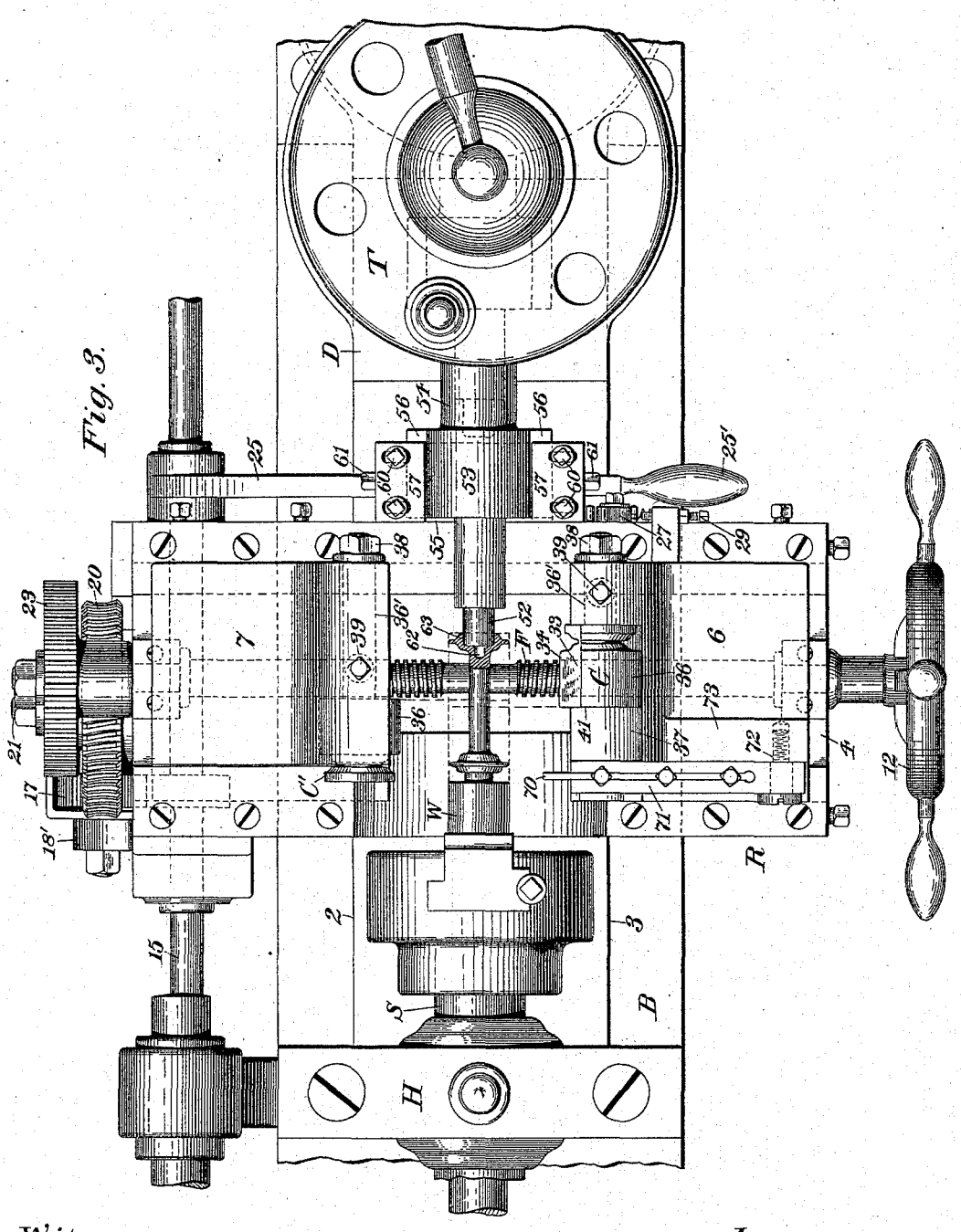

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Fig. 4.

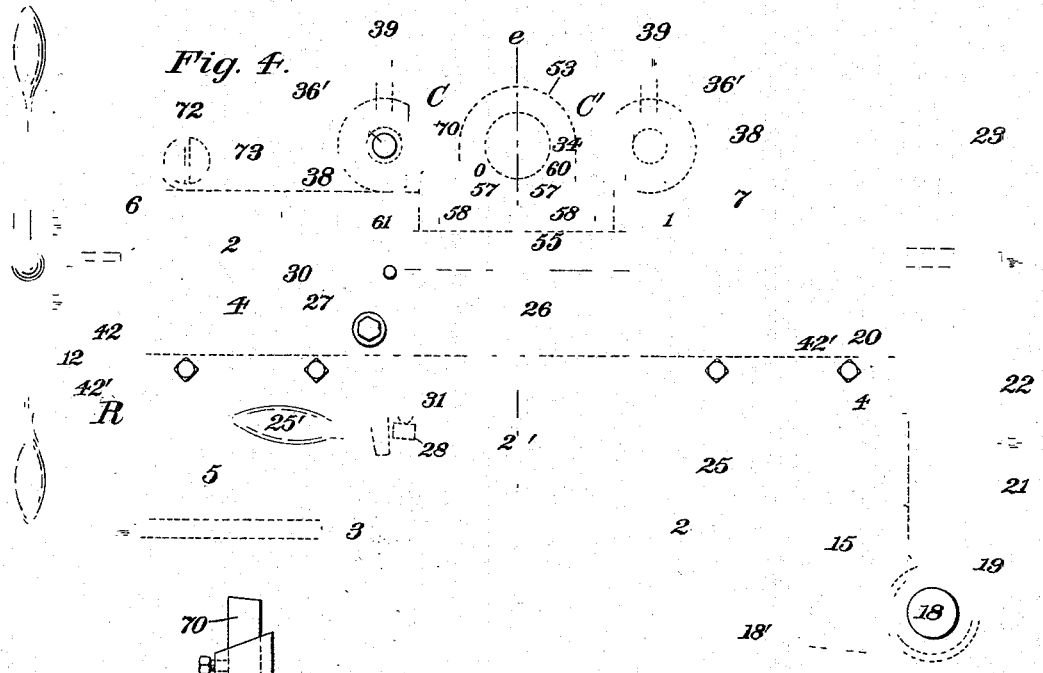

Fig. 5.

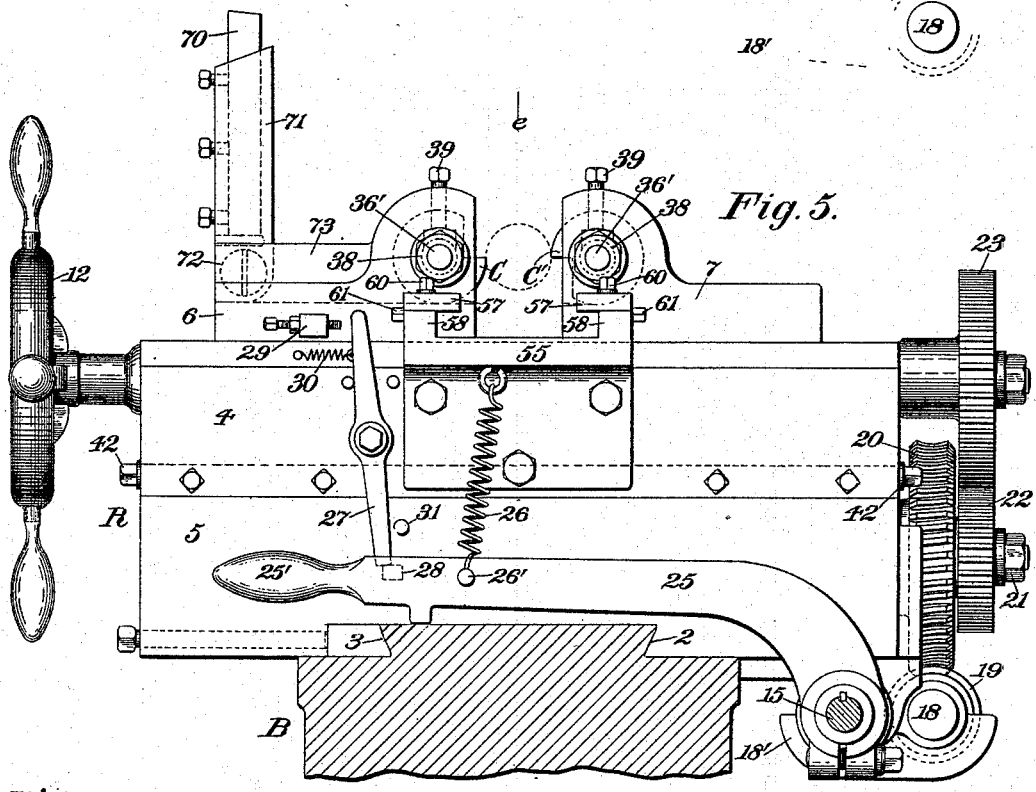

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Fig. 6.

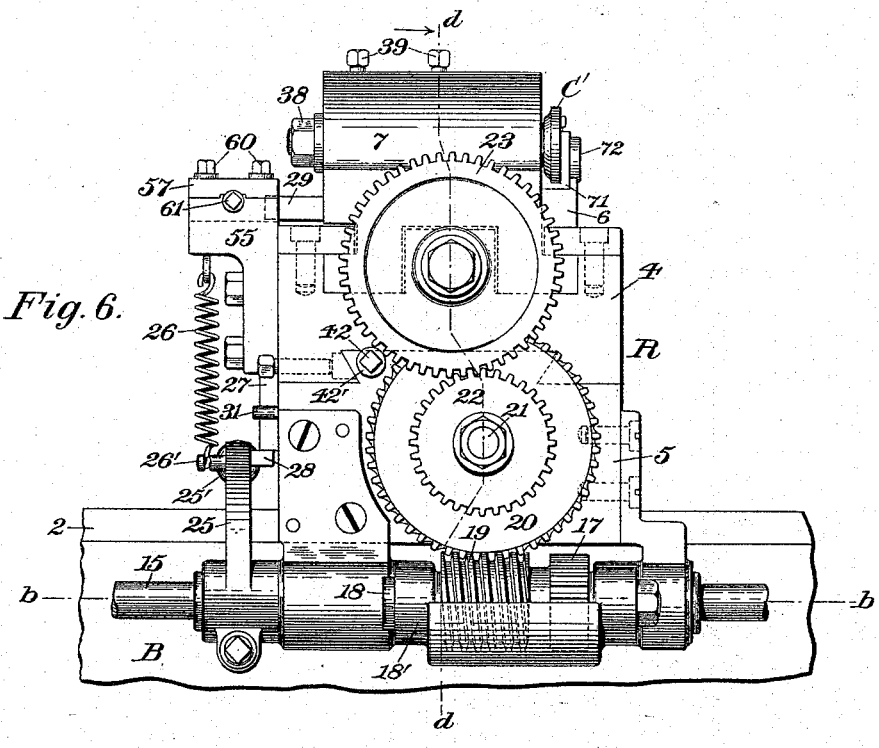

Fig. 7.

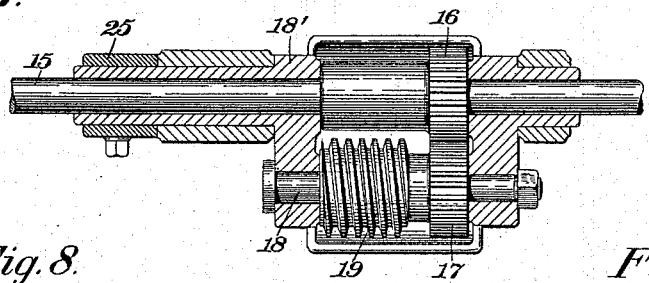

Fig. 8.

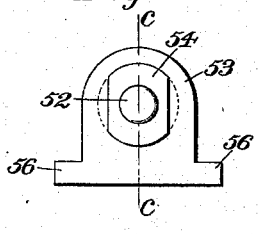

Fig. 9.

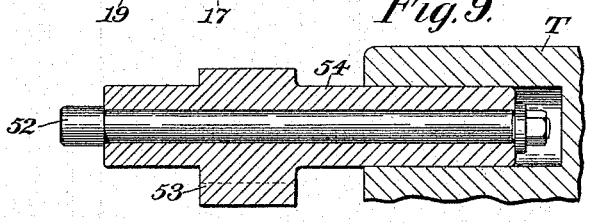

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Fig. 10.

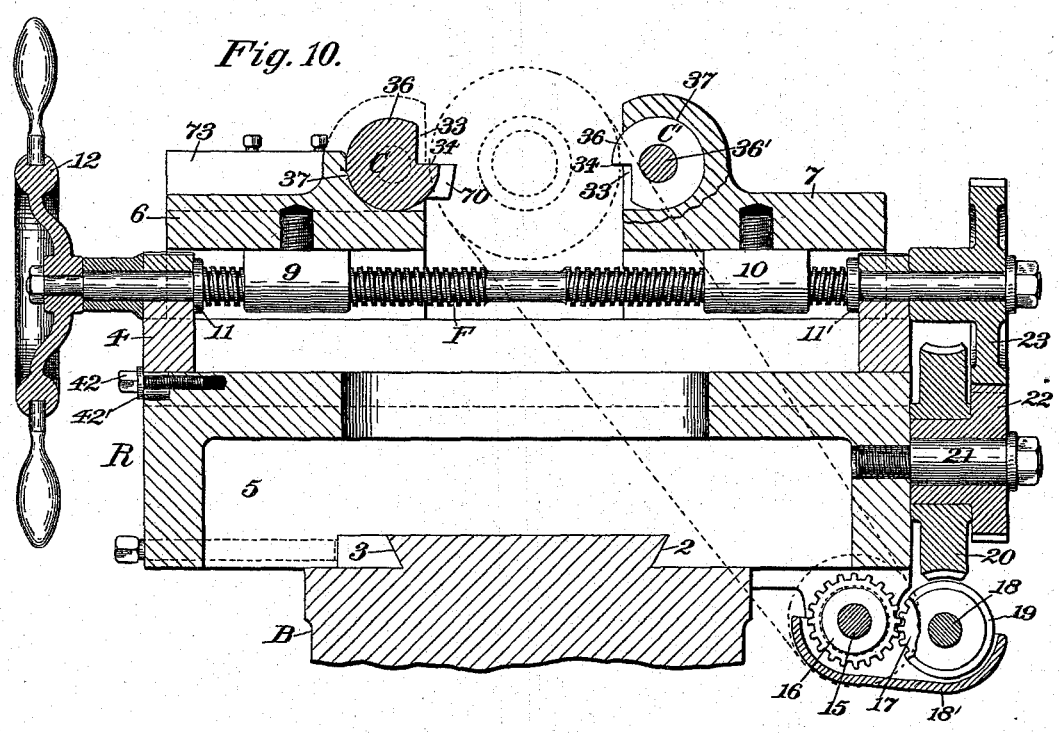
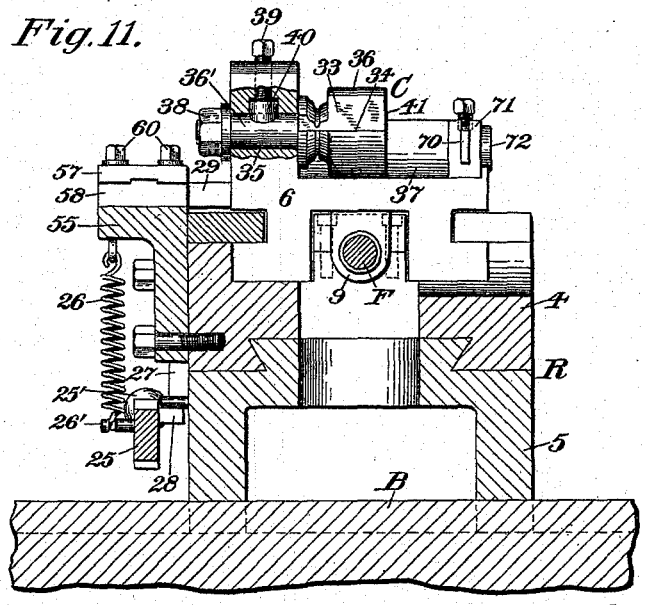


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM W. TUCKER, OF HARTFORD, CONNECTICUT.

HUB-BLANK-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,907, dated October 23, 1894.

Application filed June 2, 1894. Serial No. 513,290. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. TUCKER, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Hub-Blank-Making Machines, of which the following is a specification.

This invention relates to machines for making wheel-hub blanks, the object of the invention being to provide a machine especially adapted for making bicycle-wheel hub-blanks from a continuous metallic rod with accuracy, rapidity and economy.

In the drawings accompanying and forming part of this specification, Figure 1 is a plan view of a machine embodying my invention, said figure showing the hub-forming rod in position to be engaged by the centering-pin and in the position it occupies when being operated upon by the cutters. Fig. 2 is a side elevation of the same, as seen from the under side in Fig. 1. Fig. 3 is a plan view, on an enlarged scale, of a portion of the hub-making machine, showing the hub-forming rod turned down to form a hub-blank and in the position it occupies preparatory to being cut off, the hub-forming cutters being shown in their retracted position. Fig. 4 is a cross-sectional view of a portion of the machine taken in line *a*—*a*, Fig. 2 showing a portion of the parts at the left hand of said line as seen from a point at the right hand thereof, said figure being drawn on a scale coinciding with that of Fig. 3, and showing the cutter-feed mechanism in its inoperative position, and the cutting-off tool in its operative position. Fig. 5 is a similar view of the machine showing the cutter-feed mechanism in its operative position with the hub-forming cutters in working position and the cutting-off tool in its inoperative position. Fig. 6 is a side elevation of a portion of the machine as seen from the right hand in Fig. 5, showing the cutter-feed mechanism in operative position. Fig. 7 is a longitudinal section of a portion of the cutter-feed mechanism taken in line *b*—*b*, Fig. 6, looking downward and showing the drop-feed therefor. Fig. 8 is an end view of the carrier-pin guide. Fig. 9 is a longitudinal section of said carrier-pin guide taken in line *c*—*c* Fig. 8, showing said guide secured in place in the turret, a portion only of said turret being shown. Fig. 10 is a vertical cross-section of a portion of the machine taken in line *d*—*d*, Fig. 6, looking toward the right hand in said figure. Fig. 11 is a longitudinal section of a portion of the machine taken in line *e*—*e*, Fig. 4, looking toward the left hand in said figure.

Similar characters designate like parts in all of the figures.

My improved hub-blank making machine, in the form thereof herein shown, comprises a suitable frame, a revoluble rod-carrying spindle, a turret revolubly-supported upon a sliding carriage adapted for movement toward and from said spindle, and carrying a carrier-pin, a guiding-device for said carrier-pin, a compound slide rest supported upon the bed of the machine between the turret and rod-carrying spindle and carrying two oppositely-disposed cutters, one at each side the axial line of said spindle and adapted to have a coincident movement simultaneously toward and from each other transversely of said axial line, means for rotating said spindle, traversing-mechanism for said cutters, an automatic let-off device in connection with said traversing-mechanism and the cutter-carriers, and means for reciprocating the turret-supporting carriage, all of which will be hereinafter more fully described.

The framework of the machine, which may be of any suitable construction for carrying the several operable details, is shown in the drawings of a construction similar to the construction of an ordinary lathe-frame and consisting of the bed B having the usual longitudinal slideways 2 and 3.

Located at one end of the bed B of the machine, shown in Figs. 1, 2 and 3 as the right hand end, is a revoluble turret T, supported in the usual manner upon a sliding carriage D, which carriage will be moved longitudinally of the bed by any suitable mechanism, a rack-and-pinion being shown in dotted lines in Fig. 2 for accomplishing this purpose. Located at the opposite end of the machine is a spindle-carrying head H, in which is revolubly-supported the work-carrying spindle S, upon which spindle are located two sets of pulleys P and P′, one of which sets of pulleys constitutes the driving pulley for said spin-

dle, and the other of which sets of pulleys constitutes the driving pulleys for a feed-shaft, as will be hereinafter described.

Transversely-disposed with relation to, and supported upon the bed of the machine, between the turret T and the spindle-carrying head H, is a compound slide rest R, which in the form thereof herein shown, consists of two horizontal blocks or members 4 and 5, the lower one 5, of which is supported for adjustment longitudinally of the spindle-axis upon the bed of the machine, and the upper one 4 of which is supported upon slideways upon the lower member and is adapted for adjustment longitudinally of said member and transversely with relation to the spindle axis, by means hereinafter described.

The upper member 4 of the slide rest has longitudinal slide-ways at its upper face between which are supported two oppositely disposed cutter-carrying slides 6 and 7, one of which is located at one side of the longitudinal axis of the spindle, and the other of which is located at the opposite side thereof, said tool-carrying slides being moved toward and from each other, simultaneously, by means of a right-and-left hand feed screw, F, extending through right-and-left hand screw-threaded bearings 9 and 10, herein shown as secured to the under side of, and central with relation to the two slides 6 and 7, respectively, said screw being revolubly-supported at its ends in bearings formed in the ends of the upper member 4 of the slide-rest R, and being provided with washers or flanges 11 and 11′, at its ends adjacent to the inner faces of the end walls of the slide-rest which flanges prevent longitudinal movement of said screw.

As a means for rotating the feed-screw F to bring the cutters C and C′, carried by the cutter-carrying slides 6 and 7 up to the work, I have provided an automatic feed-mechanism in connection with said screw, of the well known drop-worm type, which mechanism, in the form thereof herein shown, consists of a horizontal shaft 15, journaled in bearings upon the bed of the machine at one side thereof, as shown in Fig. 1, and carrying a pinion 16, which meshes with a pinion 17, upon a shiftable worm-shaft 18, which carries a worm 19, in mesh with a worm-wheel 20, carried upon a stud 21, secured in the lower member 5, of the slide-rest, which stud carries a gear-wheel 22, which meshes with a gear-wheel 23, secured to the feed-screw F, the shaft 15 carrying a pulley 15′, at one end thereof and having power communicated thereto by means of a belt extending from said pulley 15′ over a pulley P upon the work-carrying spindle S, as most clearly shown in Figs. 2 and 10 of the drawings. As shown in the drawings the worm-shaft 18 is revolubly supported at its ends in bearings formed in the outwardly projecting arms of a bracket 18′, supported for swinging movement upon the shaft 15, said bracket being provided at one end thereof with a shifting-lever 25, the free end of which is provided with a handle 25′, which is located in convenient position to be engaged by the operator. This shifting-lever is normally held with its free end in an elevated position so as to retain the worm normally out of engagement with the worm-wheel, by means of a spring 26, secured at one end to a pin, 26′, upon the shifting-lever 25, and at its opposite end to a convenient portion of the slide-rest, as most clearly shown in Fig. 4 of the drawings. As a means for holding the worm up to its working position in engagement with the worm-wheel, a locking-lever 27, is provided, which is herein shown pivoted midway of its length upon the slide-rest with its lower end in position to engage a catch or laterally projecting lug 28, upon the inner face of the shifter-lever 25, while the upper opposite end of the locking-lever extends into the path of travel of a tripping device 29, carried upon one of the tool-carrying slides, said locking-lever being normally held with its lower end in engagement with the catch upon the shifter-lever by means of a spring 30, connected at one end to said lever and at its opposite end to the slide-rest as shown in Fig. 5. The shifter-lever is limited in its upward movement by a pin or projection 31, located above the shifter-lever upon the slide-rest, as shown in Figs. 3, 4 and 6, and the locking-lever is also limited at each side thereof upon said slide-rest.

In practice the feed-screw F will be provided, at one end thereof, with a hand-wheel 12, by means of which said shaft may be turned to bring the cutters into working position, or retract the same when the feed-mechanism before described is thrown out of working position.

In the form thereof herein shown, the cutters C and C′, for forming the hub-blank are approximately circular in cross-section, each cutter being notched or cut away at one side thereof, as shown at 33, to form a cutting edge 34, the contour of said cutting edge coinciding with the contour of one-half of the wheel-hub being formed. This form of cutter may be varied to conform to the requirements. The two cutters are of such construction and are so set with relation to each other and with relation to the rod to be operated upon as to enable them, by their co-operation, to form a complete hub-blank at one continuous cutting operation, one cutter acting upon and forming one-half, and the opposite cutter acting upon and cutting the other half of said blank, acting upon opposite sides and at opposite ends of the hub-forming portion of the rod, as will be readily understood by reference to Figs. 1, 3, 4, 5 and 10 of the drawings.

The cutter-carrying slides 6 and 7 will preferably be enlarged at their adjacent inner ends, as shown in Figs. 4, 5, 10 and 11, each slide having its enlarged end bored transversely, as shown at 35, to receive the stem or shank 36′, of the cutter, and is counter-

bored concentrically from one end, as shown at 37, to form a bearing for the cutter head, at a point opposite the cutting point of said cutter. The cutters C and C′, each consist of a head 36, and a shank 36′, which shanks extend through the bores 35 in the cutter-carrying slides, the ends of said shanks being screw-threaded and are secured in place by means of nuts 38, screwed upon the screw-threaded ends thereof and bearing against the outer faces of said slides, clamping bolts 39, being provided which are herein shown as extending vertically through the cutter-carrying slides, and bearing at their lower ends against shoes 40, which in turn bear upon the shanks of the cutters and prevent accidental rotary movement of said cutters. These cutters will be located in their respective slides in such manner that the inner ends 41, thereof will lie in opposition in slightly overlapping planes, so that in operation each cutter will cut a fraction more than one-half of the wheel-hub blank, the cutting edges of the cutters being substantially in alignment but oppositely disposed.

As a means for insuring accurate adjustment of the cutters relative to the rod W, to be operated upon so as to bring both cutters equi-distant from the axis of said rod and compensate for unevenness in wear of one cutter over the other, I have provided means for the simultaneous adjustment of the two cutters in the same direction laterally of the rod to be operated upon. This means consists of adjusting screws 42, seated in screw-threaded bearings formed in the lower member 5 of the compound slide-rest, and having shoulders 42′, bearing against the outer faces of the ends of the upper member 4 of said rest.

When it is desired to adjust the cutters laterally of the rod to be operated upon, it is simply necessary to loosen one of the adjusting screws and screw in the opposite adjusting-screw to move the upper member 4 of the slide-rest transversely of the axial line of the rod to be operated upon. This construction and organization permits the ready adjustment of the cutters with relation to the rod and insures accuracy in cutting and obviates the possibility of one cutter cutting away more stock than the opposite cutter.

The turret T will, in practice, be provided with a series of tools, herein shown as three in number, and designated by 50, 51 and 52 respectively, the ones 50 and 51 being shown in dotted lines, the one 50 being herein shown in the nature of a drill for boring the end of the hub-forming rod, and the one 51 being in the nature of a counterbore for counterboring the bored end of said rod, while the next adjacent tool 52 embodies a revoluble center or carrying pin adapted for engaging and supporting the end of the hub-forming rod during the operation of the cutters C and C′.

As a means for insuring the accurate centering of the carrying pin 52 with relation to the rod being operated upon, and to prevent lateral movement of said carrying-pin and rod when the same is being operated upon by the cutters C and C′, I have provided a guiding and holding device for said carrying-pin, which, in the form thereof herein shown, consists of a guide-block 53, having a centrally-bored stem 54, fixed in a socket in the turret T, and a slide-way, or guide 55, for said guide-block fixed to the side face of the slide-rest R. The carrier-pin is revolubly supported in the longitudinal recess in the guide-block, it being held therein by a shoulder formed at the outer end thereof and a nut screwed upon the inner end thereof, as shown in Fig. 8, said guide-block being provided near its outer end with laterally projecting flanges 56, adapted to slide between guide-straps 57, upon the guide, 55 secured to the slide-rest. This guide in the form thereof herein shown, is in the nature of a bracket secured by means of screws to the side of the slide-rest and having flanges 58 at its upper edge at opposite sides thereof, which flanges in connection with the straps 57, which are adjustably-secured thereto, constitute the slide-way for the guide-block of the carrying pin. The guide-block 53 when moved forward to bring the carrying-pin 52 into engagement with the end of the hub-forming rod, will have a bearing at its under face against the upper face of the guide-bracket 55 and at its outer side faces against the adjacent ends of the guide-straps 57, as shown by dotted lines in Fig. 4, the space between the side flanges 58 being sufficient to permit a slight adjustment of the bracket caused by the adjustment of the upper member 4 of the slide-rest when moving the cutters together laterally of the rod to be operated upon.

To compensate for the adjustment of the cutters, as before described, and to insure a bearing contact between the ends of the guide-straps 57 irrespective of the position of said cutters, with the side faces of the guide-block 53, said straps are adjustably-secured to the upper faces of the flanges 58 by means of screws, 60, extending through elongated slots formed through said straps into said flanges, and as a means for securing said straps in their adjusted position, clamp-screws 61, are provided, one for each flange 58 which are seated in screw-threaded openings in said flanges and bear at their heads upon the outer ends of the straps 57.

In the operation of forming a wheel-hub blank with my improved machine, the hub-forming rod carried in the spindle S, is moved forward and clamped in the position illustrated in Figs. 1 and 2, the cutters C and C′ being in the position shown in Fig. 4, and the feed-mechanism for said cutters being in the inoperative position shown in said figure. The spindle being rotated, the turret is then turned on its axis to bring the boring tool into position for operating upon the end of the rod W, after which the turret is moved forward to bring the boring tool into engage-

ment with and forming the bore 62 in the end of said rod, as shown in Fig. 3. The turret is then retracted and revolved to bring the counterbore 51 into working position and moved forward to counterbore the end of said rod, as shown at 63, after which the turret is retracted and revolved, bringing the carrying-pin into position in alignment with the end of said rod, and the turret is again advanced, bringing the guide-block of the carrying-pin into engagement with the guide therefor, and the carrying-pin into engagement with the counterbored end of the rod W. The shifter-lever 25 is then thrown from the position shown in Fig. 4 to that shown in Fig. 5, which brings the feed-worm 19, into engagement with the worm-wheel 20, which, through the medium of the gear-wheels 22 and 23, rotates the feed-screw F and moves the cutter-carrying-slides 6 and 7, together with their cutters C and C′ into the position illustrated in Fig. 5 of the drawings. This operation continuing, the cutters operate upon the end of the rod on opposite sides, reducing the same until it assumes the character of a wheel-hub blank, as shown in Fig. 3 of the drawings. After the cutters C and C′ have reduced the stock to the requisite diameter, the tripping-device 29 carried by one of the cutter-carrying slides comes in contact with the upper end of the locking-lever 27 which releases the same from engagement with the shifter-lever 25 which immediately throws the worm 19 out of engagement with the worm-wheel thereby stopping the movement of the feed-screw F, after which the cutter-carrying slides may be retracted by the hand-wheel 12.

As a means for cutting-off the hub-blank after the same has been formed in the manner described, I have provided a cutting-off tool 70, which is secured in a holder 71, hinged at its outer end as shown at 72, upon an upwardly extending flange 73, at one side of the cutter-carrying slide 6, said cutter being adapted to be elevated, as shown in Fig. 5, during the operation of the cutters C and C′, and being adapted to be thrown into operative position, as shown in Fig. 4, when it is desired to cut off the hub-blank after the operation of the cutters C and C′ has been completed.

After the cutters have been retracted from the position shown in Fig. 5 to that shown in Fig. 4, the operation of forming the hub-blank having been completed, the cutting-off tool 70 will be shifted from the position shown in Fig. 5 to that shown in Fig. 4, and the cutter-carrying slides will be again advanced, either through the medium of the hand-wheel 12, or the automatic feed-mechanism before described, bringing the cutting-off tool into engagement with, and severing the rod W adjacent to the completed hub-blank.

Having thus described my invention, I claim—

1. In a machine for making wheel-hub blanks, the combination with a revoluble rod-carrying spindle and with means for revolubly supporting the end of the rod carried by said spindle, of two oppositely-disposed cutters one for each end of the blanks located one at each side of the spindle-axis with their inner cutting edges in such planes relatively to each other as will adapt them to cut the stock simultaneously in longitudinally-overlapping continuous lines and thereby complete a wheel-hub blank by a single continuous and simultaneous operation of said two cutters, slides supporting the cutters, means for simultaneously and progressively advancing said slides toward the spindle-axis and positively maintaining the cutters equidistant from said axis, and means for automatically stopping said cutters after a predetermined period of operation, substantially as described.

2. A hub-blank-making machine comprising a revoluble rod-carrying spindle, a revoluble turret supported upon a carriage adapted for sliding movement toward and from said spindle, two oppositely-disposed cutters fixed in cutter-carrying slides and having their inner cutting edges in overlapping planes relatively to each other, feed-mechanism for progressively advancing the cutter-slides transversely toward the spindle axis and positively maintaining the cutters equidistant from said axis, means for automatically stopping said cutters after a predetermined period of operation, a tool carried by the turret in position to engage the end of the rod carried by the spindle, and a tool-guiding device intermediate to the turret and spindle and adapted for positively maintaining the axis of said tool in alignment with the spindle axis, substantially as described and for the purpose set forth.

3. In a machine for making wheel-hub blanks, the combination with the revoluble rod-carrying spindle and with the revoluble turret, of two oppositely-disposed tool-carrying slides supported for sliding movement one at each side of the axial line of the spindle upon the upper member of a two-member slide-rest, two hub-forming cutters supported, one by each slide; with their inner cutting edges in overlapping planes relative to each other, a cutting-off tool carried by one of said slides at one side of the cutter-head, a tool carried by the turret and adapted for engaging the end of the rod carried by the spindle, and a guide for said tool comprising two members, one of which is secured to the tool, and the other of which is secured to the slide-rest in position to receive and guide the first-mentioned member, and means for moving the hub-forming cutters toward and from each other, substantially as described and for the purpose set forth.

4. In a machine of the class specified, the combination with a rod-carrying spindle and turret, and with a tool carried by said turret, of a transversely-disposed slide-rest compris-

ing two members adjustable longitudinally of each other, cutter carrying slides supported for movement in opposite directions upon one of said members, a guide-block secured to one of said members and having transversely adjustable guide-straps, and a guide carried by the turret in position to enter between the straps and guide-block, substantially as described and for the purpose set forth.

5. In a hub-blank making machine, the combination with the revoluble spindle adapted for carrying a rod, and with means for revolubly-supporting the end of said rod, of two oppositely-disposed cutters supported by oppositely-movable cutter-carrying slides, means for advancing said slides toward the spindle-axis and positively maintaining the cutters equidistant from said axis, means for automatically stopping said cutters after a predetermined period of operation, a cutting-off tool carried in a holder pivotally-supported upon one of said slides at one side of the cutter-head carried thereby and adapted to have the cutting edge of said tool projected beyond the cutting edge of the aforesaid cutter by a swinging movement, substantially as described.

6. In a machine of the class specified, the combination with a revoluble spindle adapted for carrying a rod, of a cutter-carrying slide, a fixed cutter carried by said slide, a cutting-off tool supported for swinging movement at one side of the aforesaid cutter, means for progressively feeding said cutter-carrying slides toward the spindle-axis and thereby shaping the rod, and means for automatically stopping said movement after a predetermined period of operation, substantially as described.

7. In a machine of the class specified, the combination with a revoluble rod-carrying spindle and with a revoluble turret supported for sliding movement toward and from said spindle, of a compound slide-rest supported for adjustmest transversely of said spindle, two oppositely-disposed cutter carrying slides located one at each side of the axial line of said spindle, drop-feed mechanism in connection with said cutter-carrying slides and adapted for moving said slides transversely of the spindle axis, cutters carried by said slides with their inner cutting edges located in overlapping planes relatively to each other, a cutting-off tool supported for swinging movement at one side of one cutter and adapted to have its cutting edge projected beyond the cutting plane of the aforesaid cutter, and an automatic let-off device in connection with a drop-feed mechanism and one of the cutter-carrying slides, substantially as described and for the purpose set forth.

8. In a machine of the class specified, the combination with the revoluble rod-carrying spindle and with the revoluble turret supported upon a sliding carriage, of two oppositely-disposed cutters having bearings at points opposite their cutting edges in tool-carrying slides supported for movement in opposite directions, one slide at each side the axial line of the spindle, upon a compound slide-rest comprising two members adjustable, one longitudinally of the other, and transversely of the spindle axis; a tool carried by the turret and provided with a guide, a guide-block secured to the slide-rest and having guide-ways in position and adapted to receive and position the guide of said tool, and means for moving the cutter-carrying slides simultaneously in opposite directions toward and from the axial line of the spindle, substantially as described and for the purpose set forth.

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