(No Model.) 4 Sheets—Sheet 1.

J. M. WELLS & O. E. WILTSIE.

AUTOMATIC LATHE.

No. 559,645. Patented May 5, 1896.

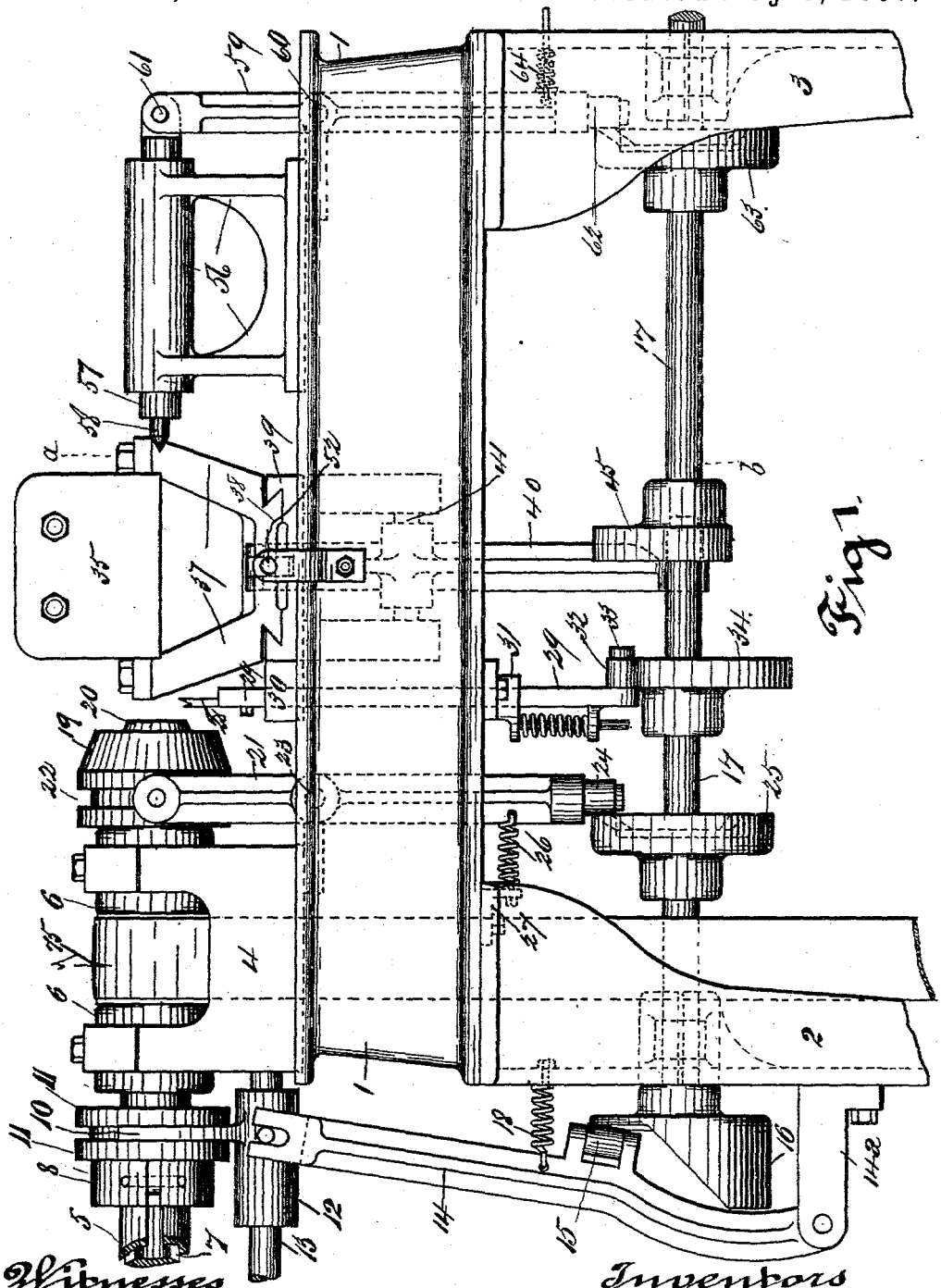

Fig. 1.

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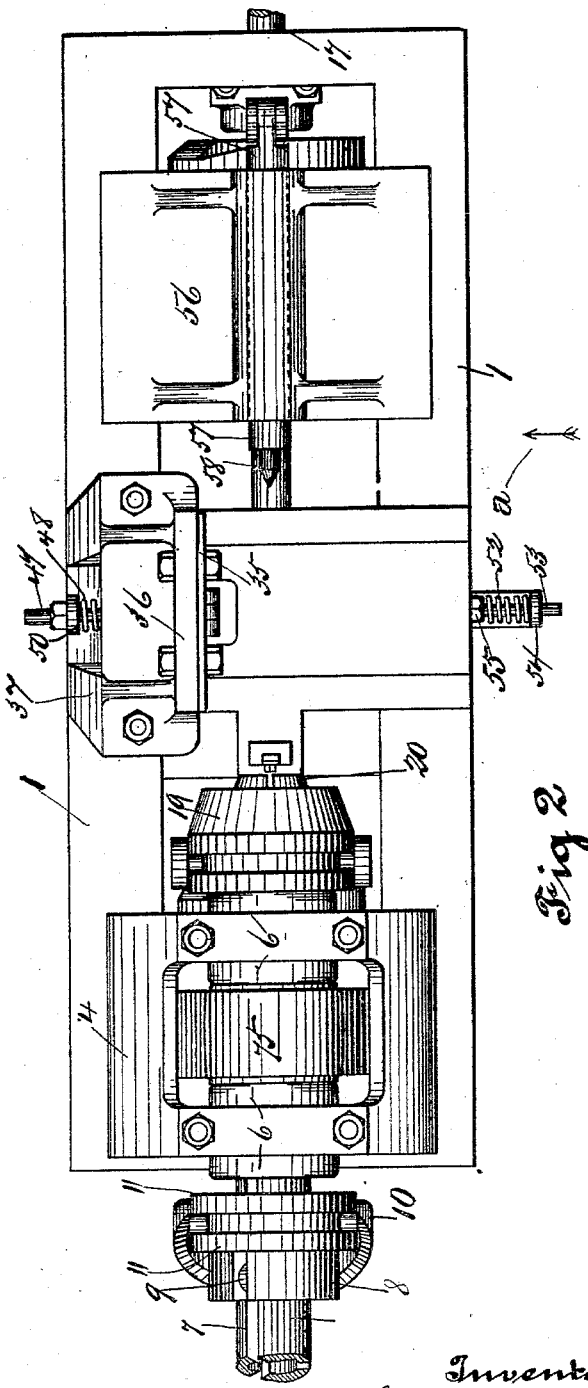

Fig. 2.

Witnesses

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J. M. WELLS & O. E. WILTSIE.

AUTOMATIC LATHE.

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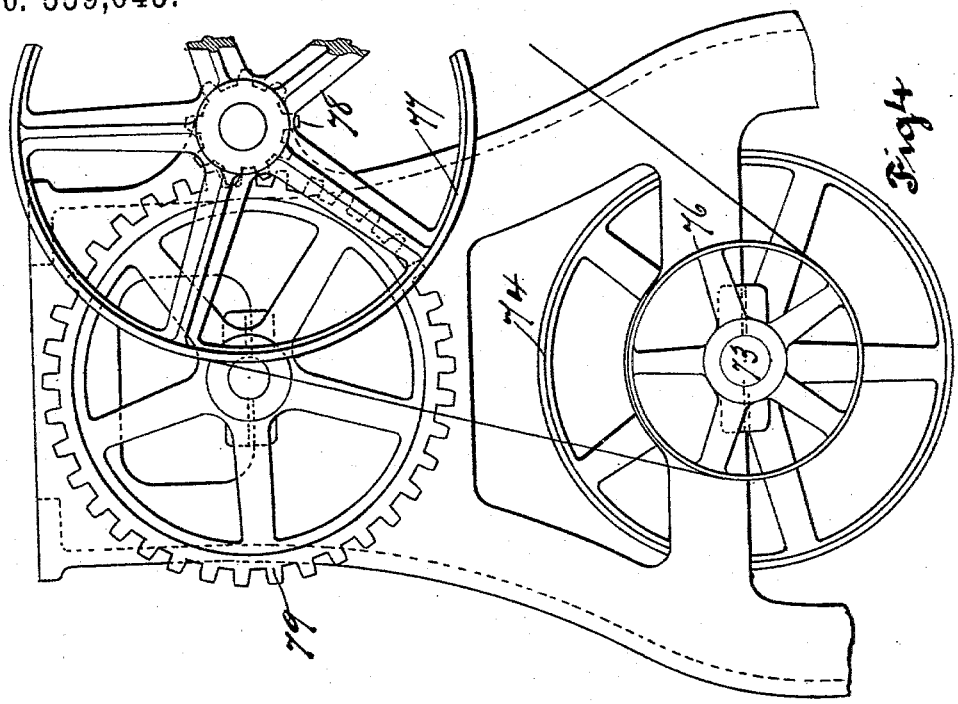

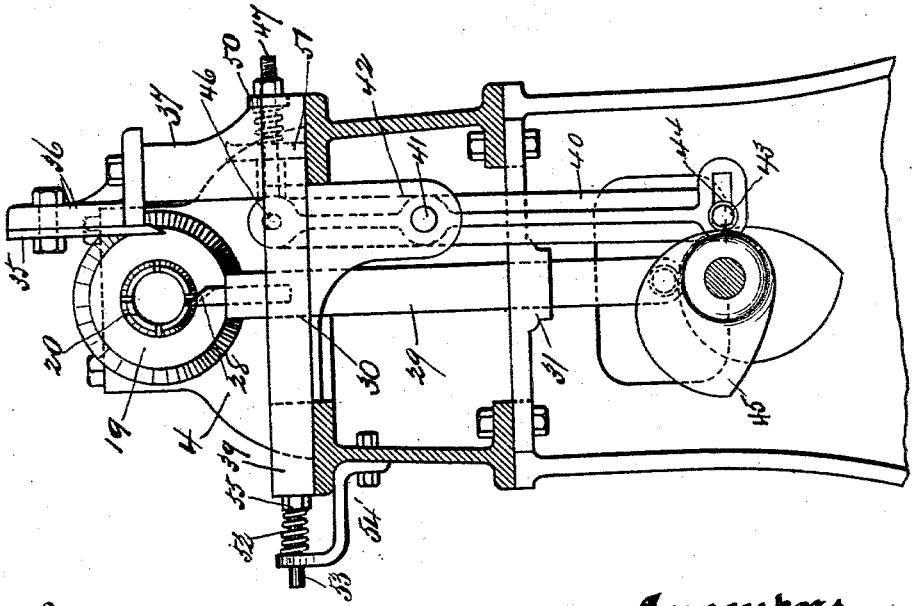

Witnesses
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(No Model.) 4 Sheets—Sheet 4

J. M. WELLS & O. E. WILTSIE.

AUTOMATIC LATHE.

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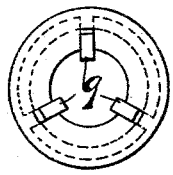

Fig 6

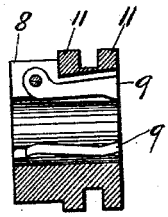

Fig 7

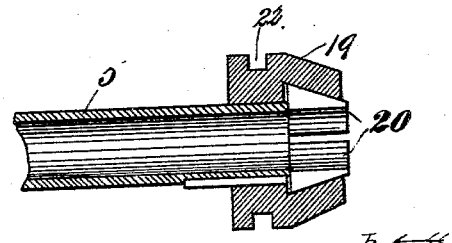

Fig 8

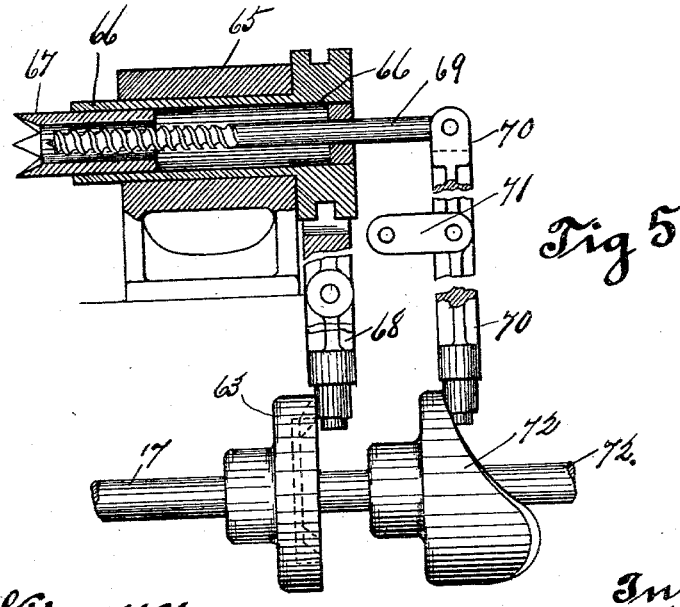

Fig 5

Witnesses

W. W. Defrees

R. R. Johnson

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UNITED STATES PATENT OFFICE.

JACOB M. WELLS AND ORRIS E. WILTSIE, OF MARION, INDIANA.

AUTOMATIC LATHE.

SPECIFICATION forming part of Letters Patent No. 559,645, dated May 5, 1896.

Application filed July 8, 1895. Serial No. 555,231. (No model.)

To all whom it may concern:

Be it known that we, JACOB M. WELLS and ORRIS E. WILTSIE, citizens of the United States, residing at Marion, in the county of Grant and State of Indiana, have invented new and useful Improvements in Automatic Lathes, of which the following is a specification.

Our invention relates to certain new and useful improvements in automatic wood-turning lathes; and it consists in means for automatically chucking, turning, centering, and cutting off and discharging the material from the machine when finished.

The object of this our invention is to provide a wood-turning lathe that is adapted to automatically form and otherwise complete handles and other wood forms automatically, and that will be capable of being manipulated by other than skilled labor. We attain these objects by means of the mechanism illustrated in the accompanying drawings, in which similar reference-numerals designate like parts throughout the several views.

Figure 1 is a broken elevational view of the machine, looking in the direction of the arrow *a* in Fig. 2. Fig. 2 is a plan view of the same. Fig. 3 is a broken sectional end view of the machine, taken through the line *a b*, Fig. 1. Fig. 4 is a broken end view of the frame, showing the driving-gear. Fig. 5 is a detail broken sectional view of another form of tail-stock, showing the automatically-traversed drill thereof. Fig. 6 is a detail end view of the feed grips or pawls of the grip-sleeve. Fig. 7 is a detail sectional view of the same, and Fig. 8 is a broken sectional view of the rotative hollow spindle and the chuck thereof.

The frame of the machine is composed of the bed 1 and the supporting-legs 2 and 3, whereon the said bed is firmly secured. The head-stock 4 is also secured firmly on the end of the bed 1, and has its hollow rotative spindle 5 journaled in its bearing 6, formed integral on said head-stock.

The outer end of the tubular spindle 5 is prolonged and has the longitudinal slots 7 formed in said projecting end. On this prolonged end of the spindle is accurately but loosely mounted the grip-sleeve 8, which is adapted to turn therewith and to slide longitudinally thereon, and in this sleeve are the pawls 9, pivoted to turn inwardly and to freely drop into and fit in the said longitudinal slots 7.

The shifting-fork 10 is adapted to loosely fit between the collars 11 of the sleeve 8 and is formed integral on the bearing-sleeve 12, adapted to slide longitudinally on the guide-rod 13, said rod firmly secured at its end to the outer end of the head-stock. The shifting-fork is automatically operated to slide and to move with it the sleeve 8 by means of the oscillating lever 14, fulcrumed on the fulcrum-bracket 14^a, secured on the leg 2, said lever provided with the cam-roller 15, which is adapted to bear or contact with the bearing-face of its operating-cam 16, which latter, being secured on the counter-shaft 17, rotates therewith and swings said lever outwardly, the return movement of the lever being accomplished by the coil-reacting spring 18.

On the opposite or inner end of the spindle 5 is mounted the chuck 19, whereon it is adapted to slide and to turn therewith. (See Fig. 8.) The portion of the chuck 19 projecting beyond the inner end of the spindle 5 has its internal surface tapered inwardly, and in this tapered portion are fitted the conical gripping-pieces 20, which butt the end of the spindle 5 at their inner thicker ends. Thus as the sleeve portion of the chuck 19 is moved inwardly in the direction of the arrow *b* the wedge-pieces 20 thereof contact with the material to securely hold it while being turned. The clutch 19 is operated to slide by means of the chuck-lever 21, the clutch-pins of which enter and neatly fit the grooves 22, said lever fulcrumed on its fulcrum-pin 23, supported by and secured in any suitable manner to the head-stock 4, and provided with the cam-roller 24, adapted to contact with the bearing-face of its operating-cam 25, by which the said lever 21 is oscillated to operate the chuck 19 to either grip or disengage the work at the proper time—that is, the sleeve 19 engages or holds the work while the sleeve 8 is sliding backwardly from the head-stock 4, and said sleeve 19 disengages its work while said sleeve 8 is traversing forwardly and feeding the material into the machine to be turned. The roller 24 is held firmly against the bearing-face of its cam 25 by the retaining-spring 26, secured at one end to the lower end of the

lever 21 and at its opposite end to the spring-bracket 27, secured to the leg 2.

The cut-off knife 28 is firmly secured on the side of the knife-bar 29, which is adapted to slide vertically in the guideways 30 and 31. The cam-roller 32 is journaled on the pin 33, secured on the bottom end of the bar 29, said roller adapted to contact with the bearing-surface of the cam 34, by which latter the said bar is moved vertically upward at the proper interval of time to cause the knife 28 to cut off the material when turned and finished.

The forming knife 35 is secured on the face of the knife-holder or angle-plate 36, which latter is adjustably secured on the traversing carriage 37. The traversing carriage 37 has the dovetail bearings 38, adapted to accurately fit and to slide in the similarly-formed ways formed in the guide-plate 39, which is secured to the bed 1, and by which the said carriage 37 is guided to slide transversely to the work to be turned.

The transverse movement of the carriage is imparted to it by means of the cam-lever 40, which is pivoted at a central point on its fulcrum-pin 41, secured in the ends of the depending supporting-arms 42, formed integral on the carriage-plate 39. The bottom end of the lever 40 is slotted to receive the pin 43, whereon the cam-roller 44 is journaled, and which latter is adapted to contact with the bearing-surface of the cam 45, secured on the shaft 17. The top end of the lever 40 is drilled to receive the pin 46, which passes through an eye of the bolt 47, which connects the said lever with the carriage 37. In order to prevent vibration of the carriage 37 during its traversing movement and also to prevent the knife 35 digging into the fork when it approaches the end of its stroke, the coil-spring 48, surrounding the rod 47, is provided with the collar 50 and the adjusting-nut 51 by which the compression of the spring is set, said spring being compressed between said collar 50 and the spring-rib 51, formed integral on said carriage, and as the carriage gradually approaches the work to be turned the said spring 48 is gradually compressed, and fully compressed when the said carriage reaches the end of its stroke. At the same time the counter-spring 52, surrounding the rod 53, is compressed against the resistance-bracket 54, and said rod is adjusted by the adjusting-nut 55, screwed on the threaded end of the rod 53.

The tail-stock 56 is secured to the bed 1 and is provided with the mandrel 57, which is adapted to receive the center 58. The lever 59 is fulcrumed on a suitable fulcrum-pin 60, secured to the bed 1, and is connected at its top end by a joint-pin 61 to the end of the tail-stock mandrel 57, and said lever has its lower end provided with the cam-roller 62, which bears against the bearing-face of the actuating-cam 63, by which the said lever 59 is oscillated to move the mandrel 57 at the proper times to disengage the work. The reverse movement of the lever 59 is accomplished by the compression-spring 64, which is also adjusted to the proper degree of compression to cause the centering-mandrel to sufficiently penetrate the work to retain it pivotally when being turned.

When it is desirable to bore an axial hole through the turned work while being turned, we provide the form of tail-stock mechanism illustrated in Fig. 5, the tail-stock 65 of which is fitted with the tubular mandrel 66, having the pointed centering-barbs or pointed gagged edge 66^a, by which the work is held centrally while being turned, said mandrel being adapted to turn and to slide longitudinally in its bearing. When so desired, a separate centering-piece 67 may be fitted in the hollow tubular portion of the said mandrel 66, from which it may be removed when so desired. The lever 68 is manipulated in a similar manner to the lever 59 and is adapted to be operated by the cam 63 on the shaft 17. The auger or drilling-tool 69 is inclosed concentrically in the mandrel 66, and the lever 70, fulcrumed on the link 71, is operated to oscillate at the proper time to cause the auger 69 to enter the rotating work and to be returned therefrom before the lever 68 is operated to reverse the mandrel 66 to release the center 67 from the work by means of the cam 72.

The counter-shaft 73 is driven by any suitable pulley-and-belt connection. The pulley 74 drives the spindle-pulley 75, secured on the spindle of the head-stock. The counter-shaft 17 receives its motion through the belt-pulley 76, driving the pulley 77, and the pinion 78, driving the spur-wheel 79 on said shaft 17, whereon the cams previously described are secured.

The work to be operated upon by the machine is cut to sizes sufficient to be entered into and through the hollow spindle 5, and at the proper time the traversing grip-sleeve 8 moves forward to cause the dogs 9 to grip the material and feed the material into the lathe. At the same time the centering piece or pin 58 moves to pivotally center the opposite end of the material to be turned. Immediately the pin 58 has centered the end of the work the carriage 37, having the forming-knife 35 secured thereon, is automatically moved toward the work to cause its knife 35 to contact with the rotating material to form it.

The carriage 37 having traversed inwardly its proper and prearranged amount of travel it immediately reverses its movement, at which time the cut-off knife 28 ascends to cut or sever the material undergoing operation, which, when done, it is immediately forced to descend by its reversing-spring 34^a. Simultaneous with this movement the pin 58 recedes from engagement with the finished work and the turned piece is permitted to fall from the machine into a suitable receptacle. The sleeve 8 during this time has traversed backwardly its full extent, and im-

mediately the turned piece is discharged from the machine said sleeve is rapidly reversed to move or feed the material into the machine and in position against the centering tool or pin 58, and the same operation is repeated till the entire length of the piece undergoing operation is fed into the machine and turned and cut into the several required finished lengths. When it is required to bore the material centrally, the form of tail-stock illustrated in Fig. 5 is employed, and the drill or auger 69 is caused to advance or feed into the material simultaneously with the forward movement of the carriage 37, and said drill is required to recede rapidly from the work on or before the knife or cutter 28 has entirely severed the finished portion of the material from the unfinished material and needs no further explanation.

Having thus fully described the nature and construction of this our invention, what we claim as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In an automatic lathe, the combination with a rotative hollow spindle, of a grip-sleeve mounted to turn with said spindle and to traverse longitudinally thereon and having dogs adapted to grip the material when said sleeve is traversed in one direction only and to feed the work, a chuck-sleeve having an interior inwardly-tapering surface, said sleeve mounted on said spindle to turn therewith and slide longitudinally thereon, conical centering chuck-sections adapted to fit in said sleeve and having parallel concave engaging surfaces, a lever and cam for traversing said grip-sleeve, and an independent lever and cam for traversing said chuck-sleeve, substantially as described.

2. In an automatic lathe, the combination with a hollow rotating spindle, a chuck-sleeve mounted on said spindle, and means for automatically operating said chuck to engage and to disengage the work at the proper times, of a tubular rotative centering-spindle adapted to be traversed longitudinally, a non-rotative boring-tool mounted concentrically in said tubular centering-spindle, centering and boring tool traversing cams, independent oscillating levers connecting said centering-spindle, and said boring-tool to their respective operating-cams to traverse the former at their proper intervals of time, substantially as and for the purpose set forth.

3. In an automatic lathe, the combination with an automatically-operated centering-spindle, of a forming-knife carriage adapted to traverse transversely with the rotative axis of the work, an oscillating lever, a cam having its bearing-surface contacting with the lower end of said lever, a yielding connection between said lever and said carriage and a resistance-spring adapted to bear against said carriage to oppose its forward movement and to reverse its movement when released, substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

JACOB M. WELLS.
ORRIS E. WILTSIE.

Witnesses:
WILLIAM H. BIEN,
OTTO L. CLINE.