(No Model.) 4 Sheets—Sheet 1.

F. E. FISHER.

AUTOMATIC LATHE.

No. 360,215. Patented Mar. 29, 1887.

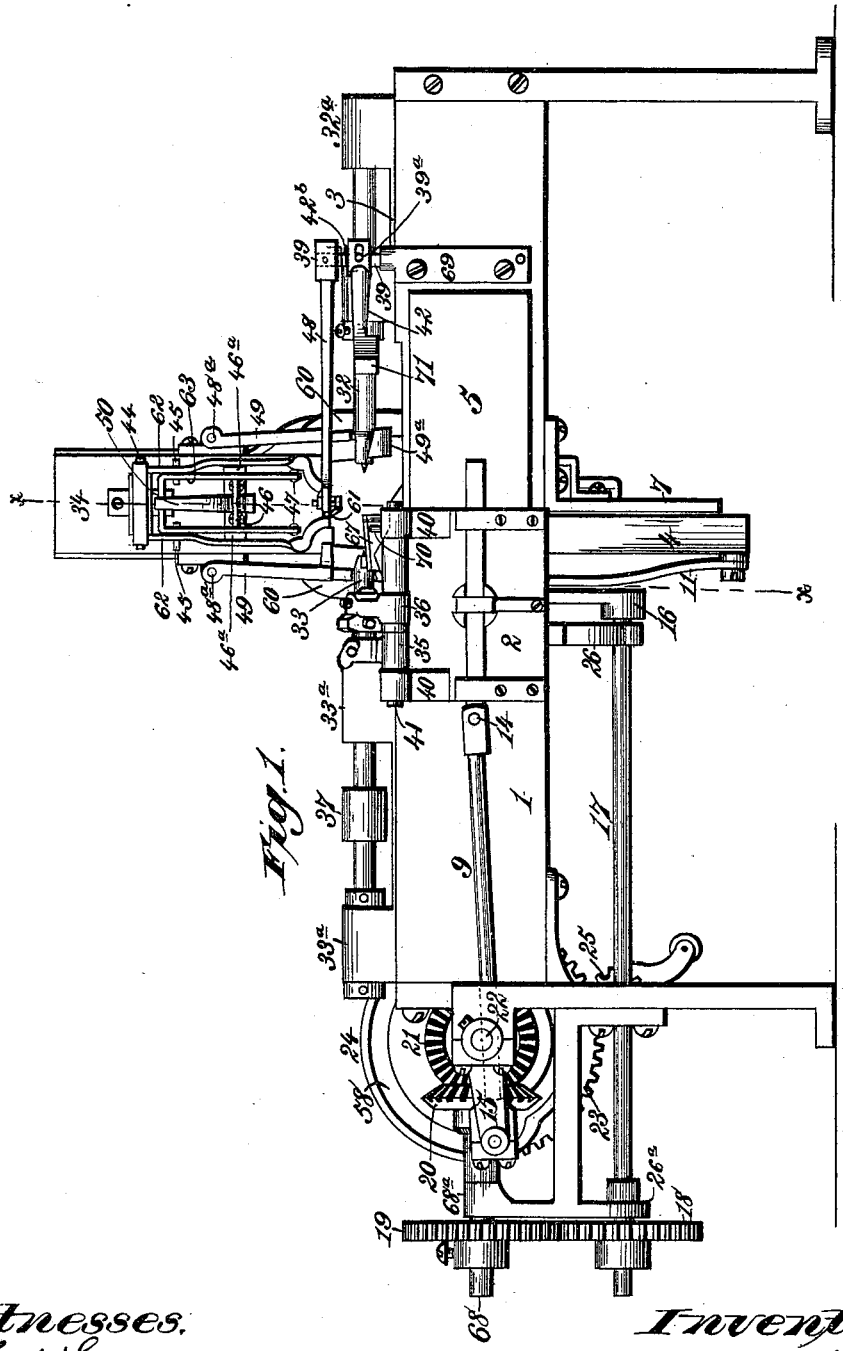

Fig. 1.

Witnesses.
Robt Everett.
Percy B Hills.

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By James L. Norris.
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(No Model.) 4 Sheets—Sheet 2.

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AUTOMATIC LATHE.

No. 360,215. Patented Mar. 29, 1887.

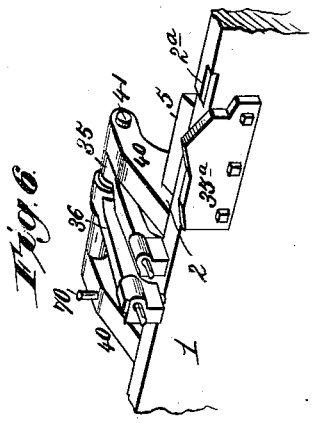

Fig. 6.

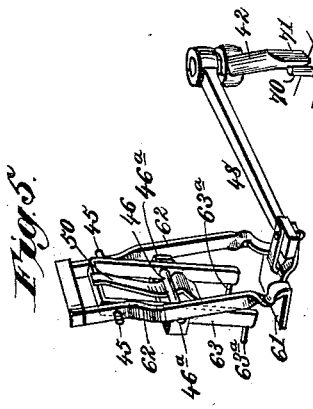

Fig. 5.

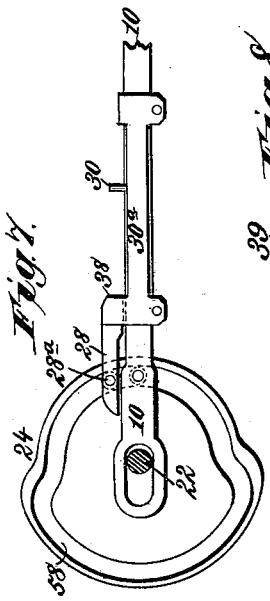

Fig. 4.

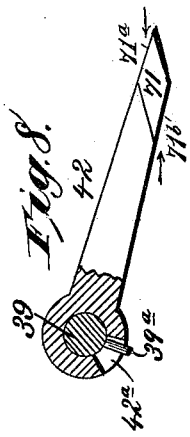

Fig. 8.

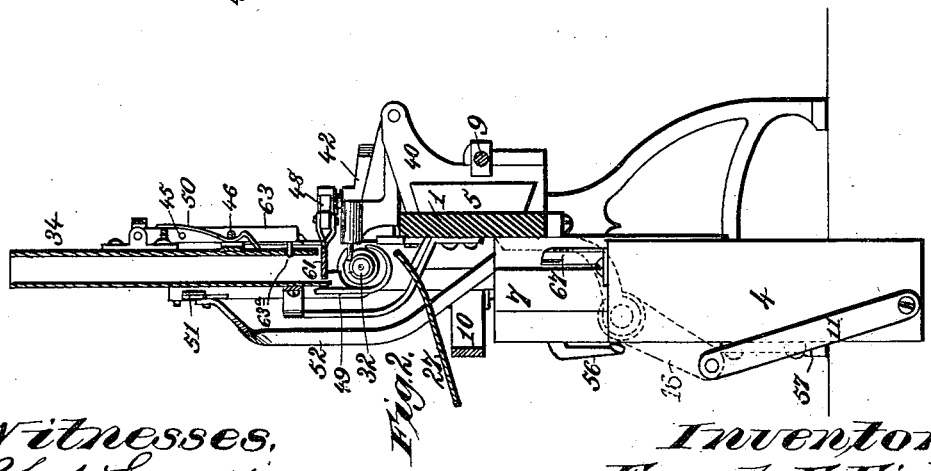

Fig. 2.

Witnesses,
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(No Model.) 4 Sheets—Sheet 3.

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AUTOMATIC LATHE.

No. 360,215. Patented Mar. 29, 1887.

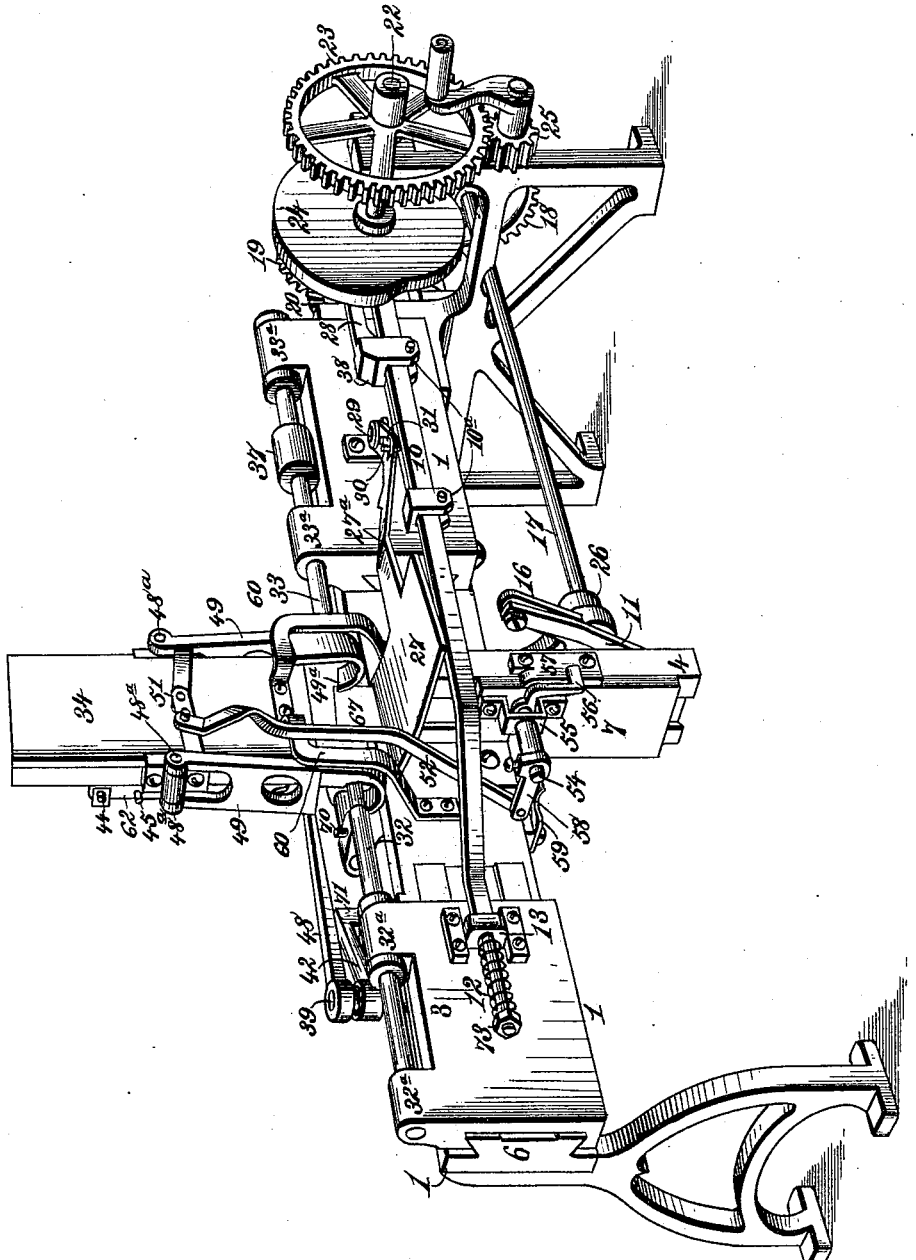

Fig 3.

Witnesses.
Robt Everett,
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(No Model.) 4 Sheets—Sheet 4.

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AUTOMATIC LATHE.

No. 360,215. Patented Mar. 29, 1887.

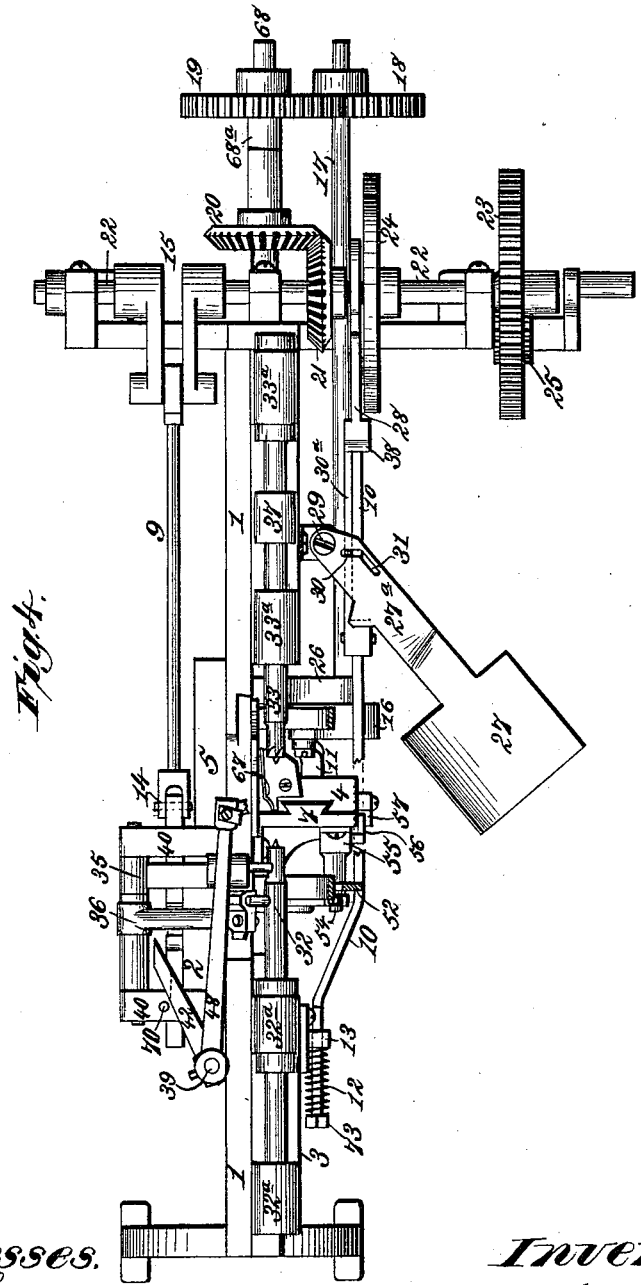

Fig. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

FRANK E. FISHER, OF DETROIT, MICHIGAN.

AUTOMATIC LATHE.

SPECIFICATION forming part of Letters Patent No. 360,215, dated March 29, 1887.

Application filed January 29, 1885. Serial No. 154,344. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. FISHER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Automatic Lathes, of which the following is a specification.

My invention relates to automatic lathes; and it consists in the several novel features of construction and combinations of parts hereinafter fully set forth, and definitely pointed out in the claims following this specification.

In the accompanying drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a vertical section taken in the plane *x x*, Fig. 1. Fig. 3 is a perspective view. Fig. 4 is a plan view. Fig. 5 is a detail perspective of the mechanism by which the blanks are delivered from the chute to the machine. Fig. 6 is a detail perspective of the rounding and forming knife carriers. Fig. 7 is a cross-section of shaft 22, showing the cam-wheel and rod which reciprocate the dead-spindle and the arm moving the delivery-plate. Fig. 8 is a detail of the lever by which the blank-feeding mechanism is operated.

In the said drawings, the reference-numeral 1 denotes the frame of the machine, which is mounted upon suitable legs, and partly cut away at the central portion, as shown in Fig. 3. A sliding carriage, 2, is mounted on and supported by a dovetailed projection, 5, attached to the side of the frame. A pitman, 9, is pivoted to the end of a bar, 14, keyed to the carriage 2, and is connected with a crank, 15, upon a transverse shaft, 22, which carries on its other end a large gear-wheel, 23, driven by a pinion, 25, fixed on a separate shaft and driven by any suitable power.

Upon the shaft 22 is a large cam-wheel, 24, having cut in its face a cam-race, 58. A bevel-gear, 21, is also mounted on shaft 22, and at right angles to the latter shaft is arranged a shaft, 68, in the same horizontal plane with shaft 22, and journaled at one end in one of the boxes carrying the shaft 22 and at the other end in a box, 68^a, formed on an extension of the machine-frame. A bevel-gear, 20, is carried on shaft 68, and meshes with the gear 21. A live-spindle, 33, is mounted in bearings 33^a on the frame and driven by a belt acting upon a pulley, 37. The numeral 32 represents the dead-spindle. The live-spindle has its end provided with teeth to grasp and rotate the article to be turned, while the dead-spindle has a pointed end to center the work, and is journaled in boxes 32^a, upon a sliding carriage, 3, sliding on a dovetailed projection, 6, upon the frame.

A connecting-rod, 10, is secured at one end to carriage 3, the end of said rod being passed through a lug, 13, on the carriage and then through a coiled spring, 12, said spring being confined between a nut, 73, on the end of the rod and the lug 13, so that when moved toward the right in Fig. 3 the spring 12 will be compressed and move the carriage, the retrograde movement being produced by the enlarged part of the rod 10 pressing on the lug 13. The purpose of this arrangement is to allow some yielding and still maintain pressure when the dead-spindle is forced against the work. The rod 10 slides in bearings 10^a on the frame, and has upon its end a pin, which enters the cam-race 58, whereby the rod is reciprocated by the rotation of the cam-wheel 24.

Upon the carriage 2 are formed two lugs, 40, which support a rod, 41, upon which are journaled two arms, 35 and 36, in such manner that their free ends can rise and fall; but they are prevented, in any suitable manner, from longitudinally moving on the rod. The free end of rod 36 rests upon the top of frame 1, and the free end of arm 35 also rests upon the top of said frame; but the under part of arm 36 is cut away, so that the end of said arm rests on the edge of the top of the frame farthest from rod 41, or upon the inner portion of the edge, while the end of arm 35 rests upon the outer portion of the edge of the top of the frame. The object of this is to permit the free ends of said arms to travel in different but parallel paths as said arms are drawn along the top of the frame by carriage 2.

In the free ends of arms 35 and 36 are placed knives of a kind adapted to turn wood, the knife in arm 35 projecting somewhat farther toward the spindles than the knife in arm 36. That part of the top of frame 1 on which the free end of arm 35 travels is horizontal until it passes the end of the live-spindle, when it rises to raise the knife and prevent it from coming into contact with said spindle, the rise being effected by an angular or cam portion,

2ª, Fig. 6, formed on the frame 1. On that part of the bed along which the free end of arm 36 travels is bolted a form, 35ª, having the general contour of the article to be turned, and so placed that the free end of the arm will follow the form and turn the work to the desired shape. The form mentioned is shown in the drawings in Fig. 6, and its use is so well known and its construction and application to the machine so familiar to those skilled in the art as to require no further description.

Above the lathe is mounted a chute, 34, by which blanks are fed to the lathe, said chute being supported by arms 60, in such position that blanks passing through the chute will have their centers brought into the line of the spindle-centers and within the space between said spindles.

Upon the chute 34 are pivoted two arms, 62, by means of a pin, 44. These arms carry at their lower end a plate, 61, which projects under the chute and over the frame of the machine, where it is pivoted to a lever, 48, Fig. 2. Upon opposite sides of the center of the chute are pivoted two arms, 49, upon pivots 48ª, said arms extending down below the spindles and having their lower ends provided with hooked or curved fingers 49ª, which underlie the spindles, as shown in Figs. 1 and 3. These arms are connected by a toggle, 51, operated in a manner presently to be shown.

Upon one side of the chute 34 is a U-shaped frame, 63, having its upper end pivotally connected with the arms 62 by pins 45, and pivotally mounted upon the wall of the chute by means of a pivot-bar, 46, having bearing in brackets 46ª, and passing through the parallel arms of frame 63 at or near their central portion. The lower ends of the parallel arms of the frame 63 carry pins 63ª, Figs. 2 and 5, which project through openings 47 in the wall of the chute, formed at such height from the bottom of the chute that when the latter is full of blanks resting on the bottom plate, 61, the pins on frame 63 will be opposite to the second blank from the bottom. A leaf-spring, 50, is secured to the side of the chute and presses upon the upper end of frame 63, forcing it toward the chute and normally drawing the pins 63ª out of the interior, as shown in Fig. 2. Lever 48, which operates the arms 62, and through them the frame 63, is pivoted on a vertical shaft, 39, on which is mounted a second lever, 42, beneath the lever 48, and so arranged that it can swing toward the spindles 32 and 33, without turning the shaft 39, but cannot be turned in the opposite direction without rotating said shaft.

The required connection can be made by cutting a ratchet on the shaft and placing a pawl on the lever, or by inserting a pin, 39ª, in an opening in the shaft 39 and allowing it to project through a slot, 42ª, cut through the lever. I have illustrated in Fig. 8 of the drawings the latter form of connection only, although there are several which can be used, all of which are familiar to mechanics. The free end of the lever 42 has a downwardly-extending cam, 71, having the oppositely-arranged cam-surfaces 71ª and 71ᵇ, which make contact with a pin, 70, mounted on the carriage 2, so that when said carriage travels to the right, pin 70 will force the end of lever 42 away from the spindles, thereby turning shaft 39 and swinging lever 48. This exerts a pull on the plate 61, drawing it out from beneath the chute. When the carriage 2 moves toward the right, Figs. 2 and 4, the pin 70 will swing the lever 42, but without affecting shaft 39. The form of the end of the lever 42 by which these functions are secured is shown in Fig. 8. The levers 42 and 48 are returned to their original position after pin 70 passes off the cam end of the former by the action of the spring 50 and the arms of the frames 62 and 63.

Upon the frame 1 is a downward projection, 7, having a dovetail, which serves as a guide for a vertically-moving carriage, 4, to the upper end of which is secured a knife, such as is used in the well-known Whitney lathe, the blade being shaped so that its edge conforms to the outline of the article to be turned, said knife being shown in Fig. 2 and marked 67. A shaft, 17, is journaled in bearings 26 and 26ª, mounted on the frame, and carries at one end a gear-wheel, 18, meshing with gear 19, by which it is driven. At the other end the shaft has a crank, 16, connected with carriage 4 by a pitman, 11. As the knife 67 must rise, do its work, and descend while carriage 2 is traveling from the point where the knife on arm 35 ceases to work to the end of its journey and back again to said point, and as it is desirable to shorten the travel of said carriage as much as possible, to make the operation of the lathe more rapid, and also to cause the knife 67 to descend far enough to be well out of the way of the other mechanism, I prefer to make the stroke of crank 16 greater than the stroke of crank 15, thus making knife 67 travel faster than carriage 2 when shafts 68, 22, and 17 revolve at the same rate of speed.

A plate, 57, having its upper edge beveled, is secured to carriage 4. A rock-shaft, 54, is journaled in bearings formed in the extension 7 and in a bracket, 55, secured thereto. On this rock-shaft is mounted a crank-arm, 56, having its end bent so as to overlie the plate 57 and the outer edge of the carriage 4, and move thereon when the carriage 4 rises.

On the outer end of the rock-shaft 54 is mounted a second crank-arm, 58, pivotally connected to a rod, 52, the latter being connected to one member of the toggle 51, so that when the carriage 4 rises far enough to have the beveled end of plate 57 strike the end of lever 56 and actuate the rock-shaft 54, the lever 58 will be depressed and the toggle 51 drawn down, thereby forcing the lower hooked ends of the arms 49 apart. A spring, 59, bears against the under edge of lever 58, and tends to throw its end upward and restore it and the parts connected to it to their normal position the moment the cam-plate 57 passes off of

and releases the lever 56 as the carriage 4 moves downward.

A delivery-plate, 27, is formed on or attached to a shank, 27^a, and the end of the latter pivoted to the frame 1 at the point 29. In said shank 27^a is cut an angular slot, 31, which receives a pin, 30, carried by a rod, 30^a, which lies just back of rod 10, Figs. 3 and 4. The end of the rod 30^a is attached to a bracket, 38, which straddles and moves freely upon the rod 10. Said bracket is moved by a bar, 28, which has near its other end a pin, 28^a, Fig. 7, which travels in the cam-race 58, reciprocating the bracket 38, the action of the bar 30^a being very nearly the same as and synchronous with that of the rod 10.

The lever 42 is normally thrown outward, away from the spindles, by a coil-spring, 42^b, whereby the cam-surface 71^a is held in position to engage with the pin 70 as the carriage 2 moves toward the end of the frame. This swings the lever 48 and opens the chute, and as the carriage 2 returns the pin 70 strikes the cam-surface 71^b and swings lever 42 inward. After the lever 48 is actuated the chute is closed by the action of the spring 50.

The operation of the machine is as follows: A number of blanks sawed to proper size are placed in the chute and supported by the plate 61. The machine being set in motion, the carriage travels toward the right of Fig. 1 until the pin 70 operates the lever 42 in the manner set forth, drawing out the plate 61 and allowing the lower blank to drop into the curved ends 49^a of the arms 49. As the plate 61 moves out the pins 63^a are thrown inward against the second blank from the bottom and hold it, sustaining the remaining blanks in the chute until the pin 70 releases the lever 42, when the plate 61 is thrown back, closing the chute, and at the same time the pins 63^a are withdrawn, allowing the entire pile of blanks to descend and rest upon plates 61, after which the operation is repeated at each reciprocation of the carriage. The cam-race 58 in wheel 24 now acts upon pin in rod 10, actuating carriage 3 and throwing the dead-spindle 32 against the end of the blank which lies in the hooked arms 49^a, and thereby driving the other end of the blank into engagement with the live-spindle, which immediately sets it in rotation. Carriage 2 is now drawn by the action of crank 15 toward the center of the machine, and the knife on arm 35, coming in contact with the blank, rounds it, preparing it for the action of knife upon arm 36, which, being guided by the form 35^a, shapes the blank approximately to the shape of the article to be formed. As soon as the knife on arm 36 passes beyond the blank the rotation of the crank 16 raises the carriage 4 and knife 67, which finishes the work, smoothing the surface and squaring the corners, which cannot be done by a knife carried by an arm and guided by a form. As carriage 4 rises cam-plate 57 forces lever 56 outward, depresses lever 58, drawing down rod 52 and toggle 51, and spreading the lower hooked ends of arms 49, holding them in this position while plate 57 acts on lever 56. At this point the cam-wheel 24 forces carriage 3, and with it the dead-spindle 32, toward the end of the machine, releasing the finished work, which falls on the delivery-plate 27. As the carriage 4 descends cam-plate 57 releases lever 56, and the arms 49 return to position, bringing their curved ends under the spindles. The chute then is opened and a second blank released, the operations being repeated. When the dead-spindle is drawn up to a blank, the cam-race 58 in wheel 24 draws rod 28 and bracket 38 toward said wheel, and the pin 30, moving in the angular slot 31, throws the plate 27 into the position shown in Fig. 4, throwing the finished work away from the machine.

This lathe is designed principally for making telegraph insulator-pins, but may be adapted for turning other work.

Having thus described my invention, what I claim is—

1. The combination of a live and dead spindle, a reciprocating carriage driven by a crank and pitman, a trimming-knife carried by an arm pivoted on said carriage, a shaping-knife carried by an independent arm pivoted on the same support as the trimming-knife, a form guiding the latter knife, the free ends of the arms carrying said knives traveling in different but parallel lines upon a support, and an incline formed on said support to automatically raise the arm carrying the trimming-knife at the proper point, substantially as described.

2. In an automatic lathe, the combination of the following elements, viz: a live-spindle constantly driven by a belt, a dead-spindle mounted upon a carriage supported by and sliding on the frame of the lathe and having connected thereto a connecting-rod operated by a cam, whereby an intermittent reciprocating motion is imparted to said carriage, a crank secured to the shaft which carries said cam and connected by a pitman with a sliding carriage supported on the frame of the lathe, two arms pivoted to said last-named carriage, each carrying a knife adapted to operate upon a blank held between said spindles, and a vertically-moving carriage carrying a finishing-knife and driven by gearing from the shaft which carries the said cam and crank, substantially as described.

3. The combination of the carriage 2, sliding on the dovetailed support 5, the pitman 9, crank 15, shaft 22, cam-wheel 24, having cam-race 58, connecting-rod 10, having a pin engaging said race, said rod having a diminished end, a lug, 13, through which it passes, a spring, 12, coiled on the end, the nut 73, the carriage 3, dead-spindle 32, bevel-gears 20 and 21, gears 18 and 19, shaft 17, crank 16, carriage 4, pitman 11, knife 67, arms 35 and 36, pivotally mounted on the carriage 2, and the live-spindle 33, substantially as described.

4. In combination with the live and dead

spindles of a lathe and a chute supported above the ends of and between said spindles and adapted to contain blanks, two arms pivotally mounted at the ends of said chute and having hooked extremities underlying the spindle ends, a toggle connecting said arms, a connecting-rod pivoted to the toggle, and a rock-shaft and lever operating said arm, whereby the hooked arms are spread at intervals and alternately brought beneath the spindles to receive the blank fed from the chute, substantially as described.

5. In combination with the live and dead spindles of a lathe, a chute supported over said spindles and adapted to contain blanks, a plate closing the bottom of said chute, a lever carrying said plate, a rock-shaft carrying said lever, a lever mounted on said shaft and connected therewith by a pin on the shaft lying in a segmental slot in the end of the lever, and a pin on a reciprocating carriage engaging with cam-surfaces on the lever and actuating the lever carrying the bottom plate of the chute, substantially as described.

6. The combination, with a chute adapted to contain blanks, of a bottom plate hung on a lever, a rock-shaft carrying said lever, parallel arms pivoted on the wall of the chute and connected at their lower ends to the bottom plate, a frame pivoted at or about its center to the chute and pivotally connected to the parallel arms near its upper end, a spring pressing the upper end of said frame inward, pins carried by the lower ends of said arms and entering openings in the wall of the chute, and means, substantially as described, for actuating the lever carrying the bottom plate, substantially as described.

7. The combination of the chute 34, swinging arms 62, pivoted to said chute at 44, and carrying the bottom plate, 61, lever 43, pivoted to said bottom plate, 61, at 66, and connected to rock-shaft 39, lever 42, secured to rock-shaft 39 in such manner as to operate said rock-shaft only in one direction, pins 70, carried on sliding carriage 2 and adapted to engage with and swing lever 42, and frame 63, pivoted to the chute at 46 and to the swinging arms 62 at 45, and carrying at its lower ends pins adapted to pass through holes 47, substantially as described.

8. The combination of the chute 34, pivoted arms 49, pivoted to the chute at 48, toggle-joint 51, connecting-rod 52 and lever 56, spring 59, and cam 57, carried by sliding carriage 4, substantially as described.

9. In combination with the spindles of a lathe, the delivery-plate 27, having its shank pivoted to the frame of the lathe at 29, and having an angular slot, 31, in said shank, connecting-rod 23 33, reciprocated by a cam and carrying a pin, 30, which passes through said angular slot 31, substantially as described.

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