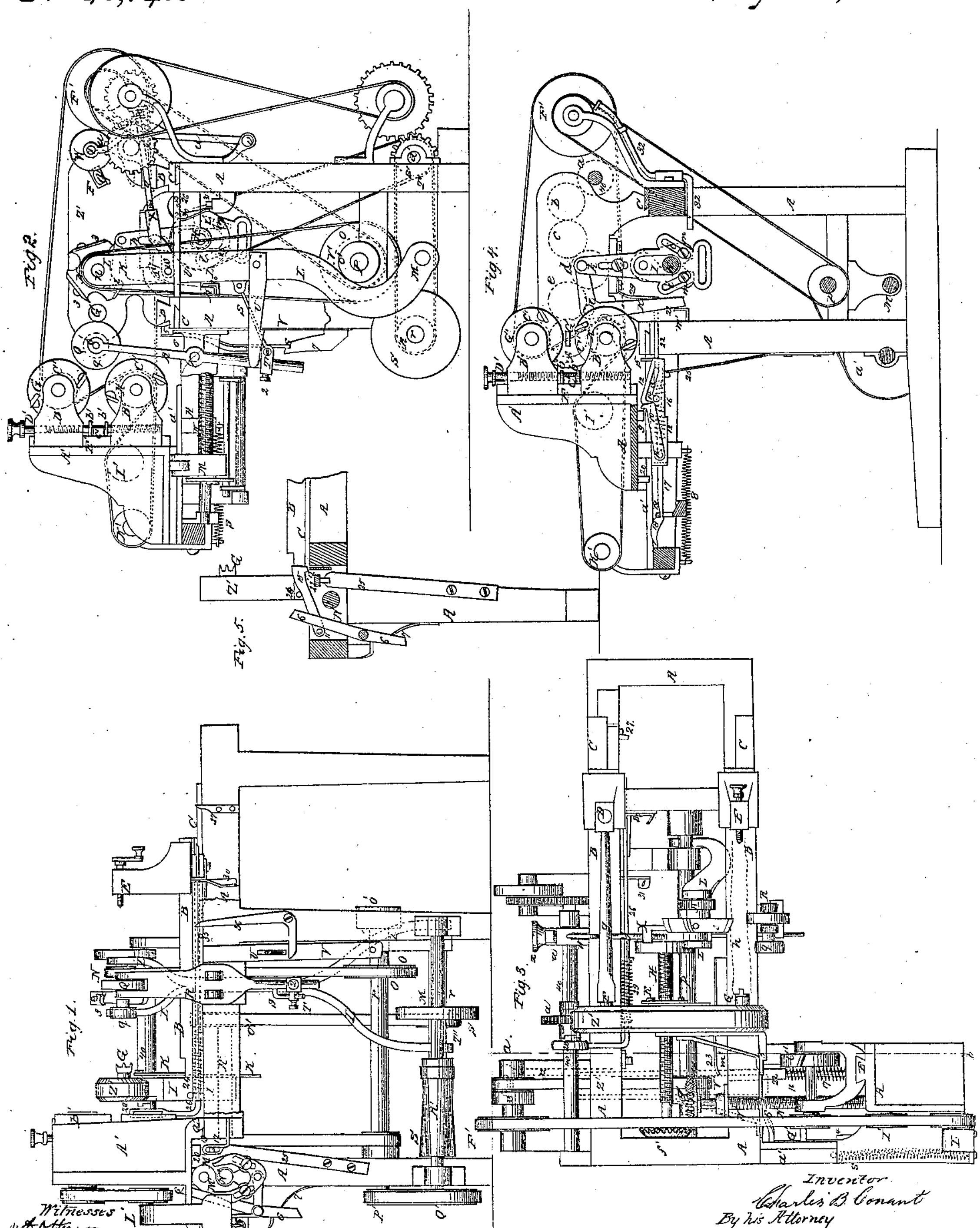
C. B. Conant,
Spoke Lathe.

No. 40,140. Patented Sep. 29, 1863.



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UNITED STATES PATENT OFFICE.

C. B. CONANT, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND JOHN D. EAGER, OF SAME PLACE.

IMPROVED MACHINE FOR TURNING IRREGULAR FORMS.

Specification forming part of Letters Patent No. **40,140**, dated September 29, 1863.

To all whom it may concern:

Be it known that I, C. B. CONANT, of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful improvements in machines for turning irregular forms and cutting tenons thereon; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a front view of said machine. Fig. 2 represents an end view of the same. Fig. 3 represents a top view thereof. Fig. 4 represents a vertical section through line *a b* of Fig. 3. Fig. 5 represents a detached view hereinafter to be referred to.

Similar letters, where they occur in the different figures, denote like parts of the machine.

My invention relates to certain combinations of devices by which I make my lathe automatic in its operation for turning irregular forms and for cutting tenons during the same operation to such articles where a tenon must be made to complete it for use—such as wheel-spokes, ax-handles, &c.—causing the various tools of the machine to operate in the proper manner, and at the proper time to produce the article to be manufactured complete at one operation.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A represents the frame of the machine.

B represents the carriage of the lathe, and C the rails or ways on which said carriage slides.

D and E are respectively the center stands for the pattern and the work, and opposite are the center bits, F and G, which are turned by the gear-wheels *a b c d e f*, which are all of the same diameter, and cause the pattern *g* and the blank *h* to turn in the same direction and at the same velocity. The lathe-carriage is moved on its ways by the action of the endless screw H on the hinged nuts I, which are secured to the carriage, and which are made to close upon the endless screw at certain intervals to feed the work to the cutters, or to open and release it when the carriage is to be moved back after having performed its operation. This opening and closing of the nuts I is effected by the action of the lever K, which turns on the fulcrum *i*, and which thus raises or depresses the slide *k*, which, by means of the inclined slots *l* and screws *m*, spreads or contracts said jaws.

L represents the cutter-frame. Its lower end is forked, and the two arms are secured to the shaft M. The revolving cutters 3 are set upon the shaft *n*, whose ends are supported by the upper forked ends of the cutter-frame. The belt-pulley N is also secured to the shaft *n*, and causes the cutters to revolve, receiving its rotary motion from the pulley O on the shaft P.

Q represents the polishing-wheel, which turns on the pin *o*, secured to the end of the lever R, and which is operated by belt-pulley *q*, receiving its motion from pulley S on shaft *r*. The lever R is pivoted to the frame A by means of pin *t*, and is connected with the cutter-frame L by means of the connecting-rod *s*, which is secured to the lever R by means of a swivel-joint, T, the position of which can be adjusted on the lower arm of said lever by means of set-screw 2, for the purpose of adjusting the position of the polishing-wheel toward the work. The cutters 3 are firmly held to the work by the hinged latch U, which catches into the steel spring V, the latter yielding sufficiently to permit the cutters to yield to the action of the pattern *g*.

W represents the friction-wheel, which is pressed and remains in contact with the pattern *g*. It turns on a pin, 1, which is supported by the lever *u*, which is pivoted at *v* to the main frame. The lever *u* is connected with the cutter-frame by means of the connecting-rod X, which is pivoted to it at *w*, and thus the polishing-wheel, cutter, and friction-roller W are moved horizontally to conform to the different diameters of the pattern. The relative position of the friction-wheel W, cutters, and polisher may be adjusted with the greatest accuracy by turning the screw-shaft *y* of the connecting-rod X by means of a handle or thumb-screw, *x*.

With this machine for turning irregular forms I combine a tenon-cutter to be used in the manufacture of wheel-spokes ax-handles, and other articles, where a tenon may be necessary to render the article fit for use. This tenon-

cutter is made to operate in conjunction with the lathe, and does its work automatically, like the lathe.

A′ represents the carriage of the tenon-cutter, which can slide horizontally on the ways *a′*. It supports the brackets B′ of the cutter-wheels C′, which can be adjusted by means of the set-screw D′, which has right and left threads cut on its shaft, and by means of which the brackets B′ are made to slide on the vertical ways E′ of the carriage A′, the screw-shaft D′ being prevented from moving longitudinally by the collars *b′* of the screw-shaft bearing against a projection, *c′*, of the carriage. The cutter-wheels C′ receive their rotary motion from pulley F′, the belt passing around the pulleys G′ and H′ of the cutter-wheels, thence around the pulley I′, which has its bearings in the carriage A′; thence around the pulley K′, which has its bearings in the standard L′, which latter is secured to the main frame A of the machine. By this arrangement of the pulleys and belt the tension of the latter is not affected when the carriage A′ is moved horizontally on its ways *a′* in the operation of the machine, and thus a perfect working of said tenon-cutters is obtained. The horizontal motion of the carriage is effected by means of the hinged jaws M′, which are caused to open and close automatically at certain intervals on the screw-shaft N′ in a similar manner as above described in regard to the screw-shaft H and lathe-carriage.

The operation of the machine is as follows: Motion being given to the main pulley O′ on shaft P, the pulley O on the same shaft is turned, which imparts motion to the pulley N and to the cutters 3, they being then in the position represented in Fig. 2 to act upon the blank. The pulley P′, Fig. 1, on shaft P operates pulley Q′ on shaft *r* and the cones R′ and S′, by means of which the velocity of the operating parts of the machine can be adjusted with great accuracy by shifting the belt on said cones to the desired position. The pulley S operates pulley *q* of the polishing-wheel Q, and pulley T′ on shaft D, Figs. 1 and 2, operates the pulley U′ and the screw-shaft H, while the tenoning apparatus receives its motion through the pulleys V′ and F′. The proper blank *h* being inserted between the bit G and center stand, E, the carriage B is placed in such a position that the support Z stands in the position indicated in red lines in Fig. 3. In this position the long arm of the lever K has the position shown in Fig. 2. The clamps I are open and not in contact with screw H, and the carriage of the lathe remains stationary, although the screw-shaft H revolves. The bevel-wheel *f′* on said screw-shaft, Fig. 3, imparts motion to the bevel-wheel *g′* on screw-shaft N′, and the clamps M′ are in contact with said screw-shaft, and as the latter is turned it causes the carriage A′ to traverse on its ways *a′* to the position represented in Fig. 4 at the same time that the cutters C′ revolve. This operation continues until the cutters have cut the tenon at the end of the blank near the bit G, when the hinged clamp-nuts M′ are caused to spread and release the screw-shaft N′ by the point 4 of frame A′, Fig. 3, striking against the spring-catch 5, whereby the lever 6 is thrown back by the action of the spring 7, causing the jaws M′ to release the screw N′, and the carriage A′ is sprung backward by the recoil of the spiral spring 8. While the carriage A′ is advancing to cut the tenon, the projection 9 on said carriage, Fig. 4, comes in contact and pushes the pawl 10 forward. This pawl is hinged at 11 to sliding cam 13, which is also pushed forward, while its front end is dipped by the action of the oblique slot 13 on the stationary pin 14, and strikes against the lower edge of the catch 15, springing said catch up to the position represented in Fig. 5. The spiral spring 16 on rod 17 has been compressed during said movement, said rod being held in its position by the catch 18, bearing against loop 19; but when the carriage A′, on being sprung back, as above described, has reached nearly the end of its course, the projection 20 strikes the catch 18, depresses it, sets it free, and the spring 16 shoots the rod 17 and bolt 22 forward. This action of the bolt 22 pushes the long end of the lever K out from the groove *m′* and beyond the edge 23, as represented in Fig. 4, and causes the jaws I to close upon the screw-shaft H. As the gearing and pulleys of the machine are in continuous motion, the carriage of the lathe is now set in motion by the action of screw H, and the cutters 3 perform their work upon the blank *h*, in conformity with the pattern, while the carriage is moving, the pin 24, Fig. 5, on said carriage depresses the catch 15, which acts on the front end of the sliding cam 12, which, together with the bolt 22, is thus set free and is sprung back by the action of spring 25. The carriage B moves on and the cutters act on the work, and when the carriage has arrived at the end of its course the spring-rod 26, Figs. 1 and 3, is pushed to the left by coming in contact with the stop 27. This motion disengages the clutch 28 from the wheel *a*, and consequently the motion of said wheel, of the intermediate wheels, *b c d e f*, and of the pattern *g*, and the work is arrested, as the sleeve of the clutch 28 turns with the shaft 40, while that of wheel *a* turns loosely thereon. The lever K, having also passed beyond the end of the ledge 23, is sprung back by the action of the spring 29, and the jaws I are open and disengaged from the screw H. The pin 35 operates the long arm of lever 36, and its short arm strikes against and releases catch U, Fig. 1, thus throwing the cutter-frame and polisher frame out from the work, and the wheel W out from the pattern *g*. The support Z′ and carriage B may now be pushed back to the original position shown in red lines in Fig. 3. When the spring-rod 26 is pushed to the left, the

spring 29 is compressed, and to hold the rod in its position while the carriage is pushed back the drop-lever 30, Figs. 1, 2, and 3, drops against a neck on said rod, and thus keeps the wheel *a* out of gear and stationary; but upon the carriage arriving at its original starting-point the lower end of the lever 30 strikes against the oblique projection 31, whereby it is disengaged from the spring-rod 26. The recoil of spring 29 now throws the clutch 28 in gear with wheel *a*, which then resumes its operation, at the same moment a projection on the spring-shaft 26 strikes the belt-shifter 32, which throws the belt upon the fixed pulley 33, to operate pulley F′ and the tenoning apparatus, as above described.

Having thus fully described the nature of my invention, what I claim herein as new, and desire to secure by Letters Patent, is—

1. Combining the tenon-machine with the lathe in such a manner that both shall be operated simultaneously, and that one shall so control the motions of the other that the operation of each shall be performed at the proper time for the purpose of turning out complete articles, on which round as well as straight work is to be done, substantially in the manner and for the purpose herein described.

2. In combination with the vertical carriage A′, the adjustable tenon-cutters C′, and belt-pulleys G′′, H′, I′, K′, and F′, when constructed and operated substantially in the manner and for the purpose described.

3. The arrangement of the lever 6, with its links, connecting-rods, and jaws M′, for the purpose of opening and closing said jaws on the endless screw N′, which operates the tenoner-carriage, substantially in the manner and for the purpose herein described.

4. The combination and arrangement of the sliding cam 12 and bolt 22, and the devices to operate it, with the lever K, for the purpose of automatically closing the jaws I, upon the screw H to operate the lathe-carriage at the proper time, substantially in the manner herein described.

5. Connecting the lever R of the polishing-wheel, cutter-frame L, and lever *u* of the friction-wheel W by means of the adjustable rods *s* and *x y*, substantially in the manner and for the purpose described.

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