(No Model.) 2 Sheets—Sheet 1.

R. KING.

MACHINE FOR MAKING CYLINDRICAL PINS AND TUBES OF WOOD.

No. 397,727. Patented Feb. 12, 1889.

Fig. 1.

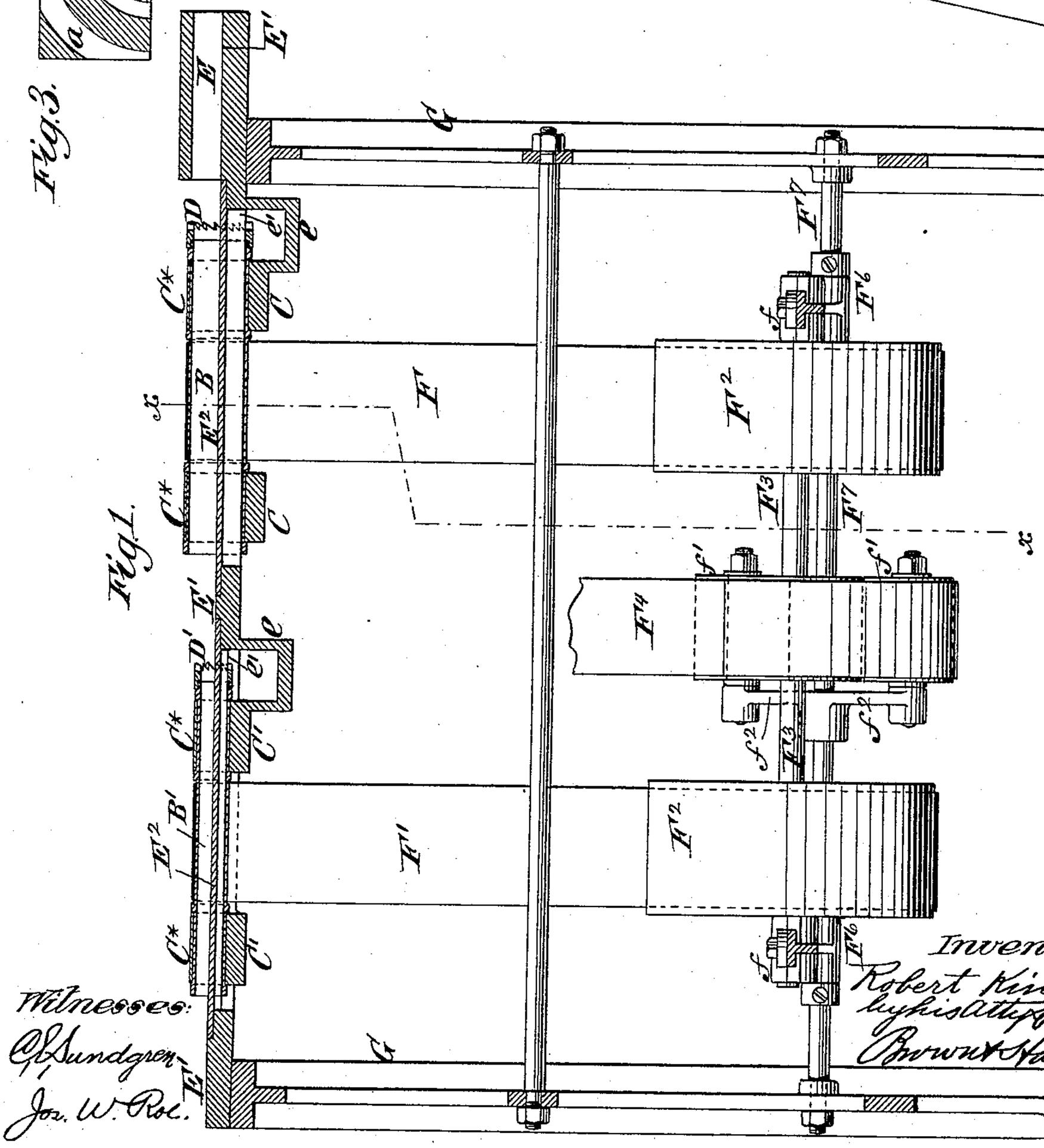

Fig. 2.

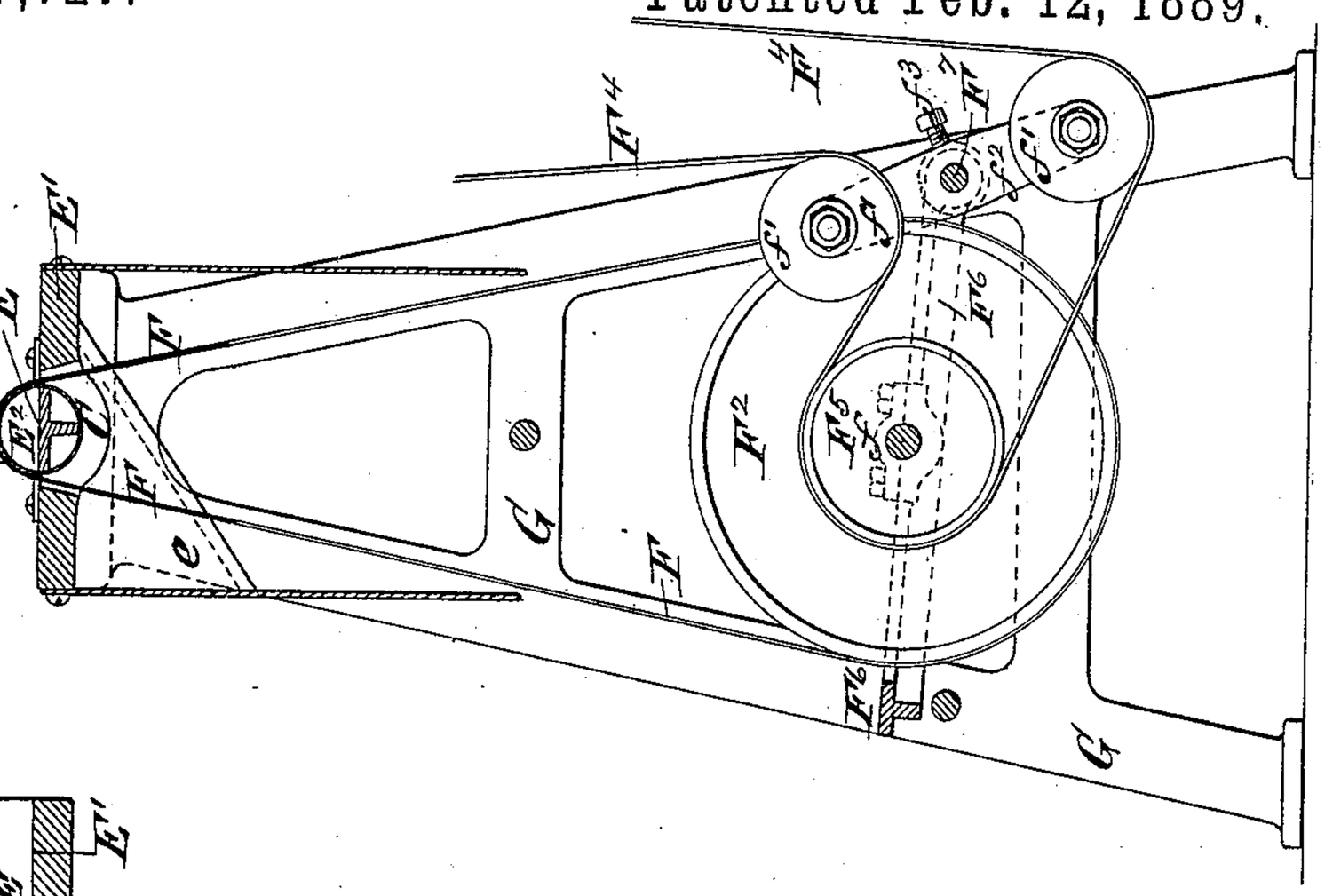

Fig. 3.

(No Model.) 2 Sheets—Sheet 2.

R. KING.

MACHINE FOR MAKING CYLINDRICAL PINS AND TUBES OF WOOD.

No. 397,727. Patented Feb. 12, 1889.

Fig. 4.

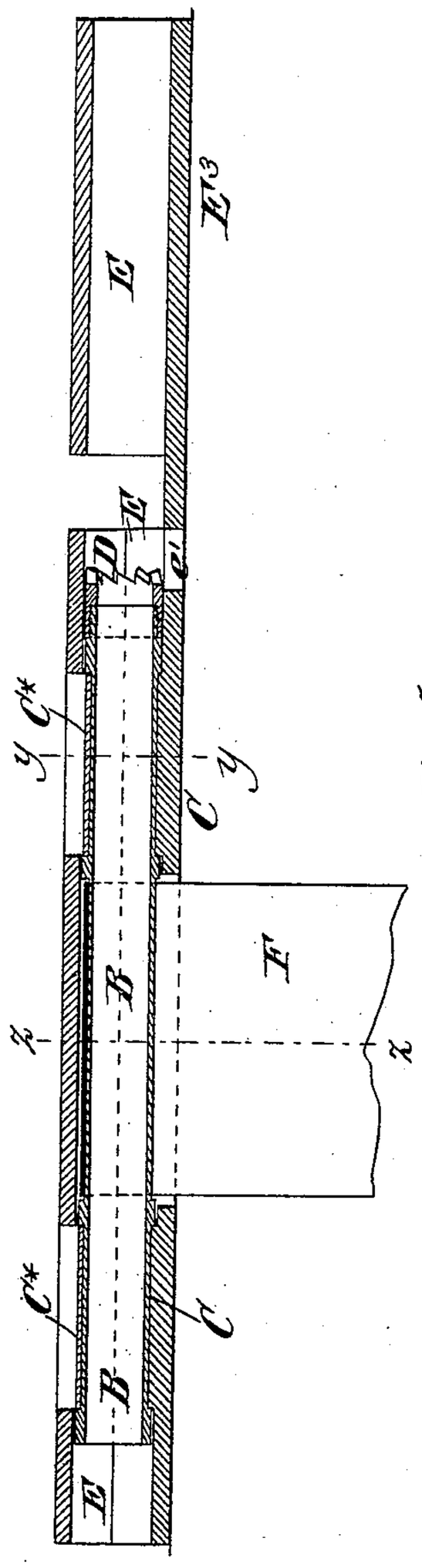

Fig. 5.

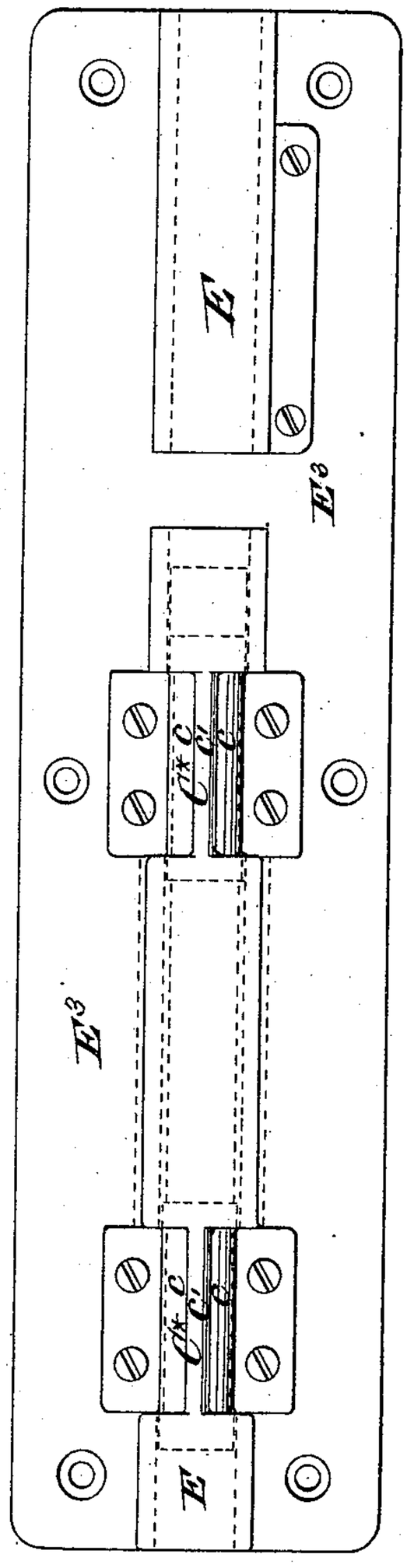

Fig. 6.

Fig. 7.

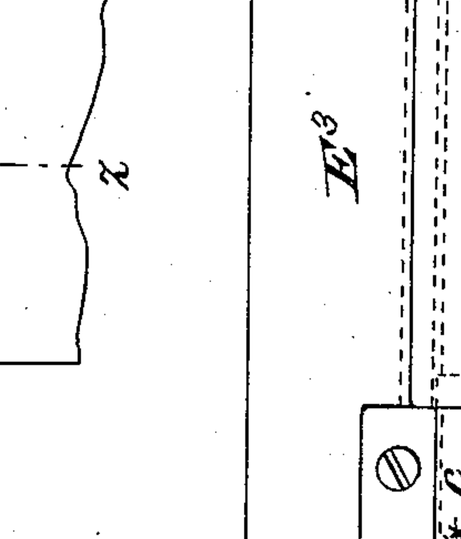

Fig. 8.

Witnesses:
C. L. Sundgren,
Joseph W. Roe.

Inventor:
Robert King
by his Attys
Brown & Hall.

UNITED STATES PATENT OFFICE.

ROBERT KING, OF BROOKLYN, NEW YORK.

MACHINE FOR MAKING CYLINDRICAL PINS AND TUBES OF WOOD.

SPECIFICATION forming part of Letters Patent No. 397,727, dated February 12, 1889.

Application filed December 31, 1887. Serial No. 259,460. (No model.)

To all whom it may concern:

Be it known that I, ROBERT KING, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Machines for Making Cylindric Pins and Tubes of Wood, of which the following is a specification.

My invention relates to machines which comprise a hollow spindle and a tubular cutter carried at the end thereof, and by which cylindric pins or semi-cylindrical sections of such pins and tubes or hollow cylinders of wood may be cut of any desired length, limited only by the length of stick from which the pins or sections of pins or tubes are to be made.

The invention will be hereinafter particularly described, and then pointed out in the claim.

In the accompanying drawings, Figure 1 is a longitudinal elevation, partly in section, of a machine embodying my invention and intended for cutting at the same time from a stick or bar of wood a semi-cylindric section of a pin and a semi-cylindric section of a tube larger in diameter than the pin. Fig. 2 is a transverse section of the machine on the plane of the irregular dotted line $x\ x$, Fig. 1. Fig. 3 is a transverse section, upon a larger scale, of a stick after it has been passed through the machine, showing the sections of the pin and tube which are cut therefrom. Fig. 4 is a longitudinal section of a hollow spindle and tubular cutter embodying my invention, and including, also, a guide for a rectangular stick, these parts being intended to form a cylindric pin from a square stick by cutting off the four corners thereof at one operation. Fig. 5 is a plan of the parts shown in Fig. 4. Fig. 6 is a transverse section on the plane of the dotted line $y\ y$, Fig. 4. Fig. 7 is a transverse section on the plane of the dotted line $z\ z$, Fig. 4; and Fig. 8 is a transverse section of a hollow spindle and the bed or table extending through the same, illustrating how my invention may be applied to the trimming off or forming of moldings which are a segment of a cylinder less than half.

Similar letters of reference designate corresponding parts in all the figures.

In Fig. 3, A designates the stick of wood, which has formed in it the arc-shaped or semi-circular cuts or kerfs $a\ a'$, extending lengthwise of it and forming from it the semi-cylindric pin-section a^2 and the semi-cylindric tube-section a^3, larger in diameter than the pin-section. It is obvious that when two of the sections a^2 are glued or otherwise secured together a cylindric pin or rod will be formed, and when two of the tubular sections a^3 are glued or otherwise joined at their flat edges a tube or hollow cylinder of wood will be formed.

I am aware that hollow spindles provided with tubular cutters have been before used; but as heretofore constructed the pin-sections or tube-sections a^2 a^3 could be made only in short lengths, because the stick of wood could not be passed beyond the driving-belt for the spindle; and the object of my invention has been to so construct and arrange the spindle and its appurtenances that the kerfs $a\ a'$ can be formed throughout the entire length of a stick many feet long, thereby producing the pin-sections a^2 or the tube-sections a^3 of corresponding length.

Referring now to Figs. 1 and 2, B designates a tubular spindle mounted in bearings C, and carrying at its end a tubular cutter, D, which is of a size to form the kerf a, and B′ designates a corresponding spindle mounted in bearings C′, and having upon its end a smaller tubular cutter, D′, adapted to form the kerf a'. These spindles B B′ are arranged in line, and at the feeding end of the machine is a rectangular guide, E, which is of a size to receive the rectangular stick, A, which is to be cut and prevent it from turning. The guide E is placed upon a table, E′, which, as here shown, is at each end of the machine, and which has a long tongue-like portion, E^2, extending into and, as here shown, entirely through both spindles B B′ lengthwise thereof, and which is upon the same level as the table or bed E′. The tongue-like prolongation E^2 of the table or bed E′ serves to support the lower flat surfaces of the pin and tube sections a^2 a^3 during their passage through the machine, and as the stick is pushed inward the cutter D first forms the kerf a and the cutter D′ subsequently forms the kerf a'; but it will be understood that with a long stick of wood

both the kerfs *a a'* are being formed at the same time.

The spindles B B' are driven by belts F F' from pulleys F^2 upon a shaft, F^3, and through a belt, F^4, driving upon a pulley, F^5, on the shaft F^3, motion is imparted to said shaft, and thence to the spindles. The shaft F^3 is supported in boxes *f* upon a frame, F^6, which is free to swing upon a rod, F^7, extending between the end frames, G, of the machine, and constituting one of the stretchers which connect these end frames. The belts F F' are kept taut by the weight of the shaft F^3 and its pulleys, and also by the weight of the frame F^6, which hangs virtually in the belts F F', and which is left free to rise and fall, for a purpose hereinafter described.

The driving-belt F^4 is conducted to the pulley F^5 over idler-pulleys *f'*, so that it may be taken off at one side of the machine and not interfere with the principal parts thereof, and also so that any lowering or rising movement which the shaft F^3 may have will not materially vary the length of the belt F^4. The idler-pulleys *f'* are journaled upon an arm, f^2, which is supported by the rod F^7, and may be secured in any desired position thereon by a set-screw, f^3. If the belt F^4 be too slack, the arm f^2 may be turned slightly upon the rod F^7 to tighten the belt, and then be secured in its new position by the set-screw f^3.

In order to make the belts F F' as thin as possible, I prefer to make them each of a band of steel or other thin metal having its ends brazed or soldered together.

The portions of the spindles B B' which are between their bearings C C' constitute the pulley portions of the spindles, and may be roughened or wound with thread or small cord laid on with mucilaginous substance or cement, so as to give the belts a better hold upon them. The belts in passing around the spindles B B' each describe an arc which is of less radius than the radius of the cutter D or D', and hence the arc of the belt will be accommodated in the kerf *a* or *a'*. The caps C* of the bearings C C' also have a radius less than the radius of the tubular cutter D or D', and do not therefore interfere with the passage of the stick over the entire length of the spindle, as they are accommodated in the kerf *a* or *a'*.

The bearings C C' are formed in one piece with or attached to the table E', so as to form one structure therewith, and this table, with the spindles, may be removed as one piece from the top of the end frames, G, and have substituted for it the table E^3. (Shown in Figs. 4 to 7, inclusive.) As the table E' (shown in Figs. 1 and 2) has two spindles and cutters, it is adapted to form from a rectangular stick like that shown in Fig. 3 both a semi-cylindric section, a^2, of a pin or rod and a semi-cylindric section, a^3, of a tube; but the table E^3 (shown in Figs. 4 to 7, inclusive) carries but a single spindle, B, having upon it a tubular cutter, D, and journaled in bearings C C*. The spindle and cutter B D (shown in Fig. 4) are intended for cutting a long cylindric pin or rod from a square stick by simply forming a circular kerf and severing from the stick the triangular corner pieces, *s*, as indicated in Fig. 7.

The table E^3 is constructed with rectangular guides E, for holding the stick in place and preventing its turning, and in this case also the driving-belt F in passing around the spindle describes an arc having a radius less than the radius of the tubular cutter D. The caps C* are very thin at the points *c*, which are opposite the two upper corners *s* of the stick, and may have longitudinal strengthening-ribs *c'*, which come between the two opposite upper corners of the stick or on opposite sides of which the two upper corner pieces, *s*, pass, as indicated in Fig. 6. The lower portions of the bearings C, which are formed in the table or bed E^3, have holes or channels c^2, through which the two lower corner pieces *s* pass, as shown in Fig. 6, and these two lower corner pieces *s* pass on the inside of the downwardly-extending portions of the belt F, as shown in Fig. 7.

When it is desired to form cylindric rods or pins only, the table E' may be removed from the frame G, and the table E^3, with its spindle, substituted therefor, and the same driving-belt, F or F', may be employed to drive the single spindle B on the table E^3 as was previously employed for driving the spindle upon the table E', inasmuch as any difference in the level of the spindle will be compensated for by the gravitating frame F^6, which carries the counter-shaft F^3.

The table E' (shown in Figs. 1 and 2) has a chute, *e*, extending from the opening *e'*, which receives the tubular cutter D or D', for conveying away the chips formed thereby, and the same chute, *e*, is provided on the table E^3 opposite the opening *e'*, for conducting the chips formed by that tubular cutter D thereon. With the parts shown in Figs. 4 to 7, inclusive, for forming cylindric pins or rods no table extending through the spindle is necessary, because the pin or rod completely fills the hollow spindle, and is amply supported without such table extending through the spindle.

My invention may be utilized in forming from sticks of wood moldings which constitute any-sized segment of a cylinder less than semi-cylindric.

I have in Fig. 8 shown a hollow spindle through which extends a tongue-like bed or table, E^2, having in it a triangular groove, e^2, and in this groove lies a stick, A', which it is designed to give an arc shape on its surface, so that it will form a quarter-segment of a cylinder. Inasmuch as the driving-belt for this spindle will describe an arc less in radius than the radius of the tubular cutter used upon the spindle, the portion cut off from the

stick A′ to form the segmental molding will pass outside the belt.

The table E³ (represented in Figs. 4 to 7, inclusive) is shown as wider than the table E′, (shown in Figs. 1 and 2;) but this is simply because I have illustrated it in Figs. 4 to 7 upon a somewhat larger scale than in Figs. 1 and 2 for the sake of greater clearness. The tables E′ and E³ will in practice be of the same length and width and are interchangeably fitted to the frame G.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of a hollow spindle carrying a tubular cutter, a driving-belt which in passing around the spindle describes an arc less in radius than the radius of said cutter, and a table for the work, having a tongue-like prolongation into or through the hollow spindle, substantially as herein described.

ROBERT KING.

Witnesses:
FREDK. HAYNES,
HENRY J. MCBRIDE.