(No Model.) 3 Sheets—Sheet 1.

M. E. CLARK.

MACHINE FOR TURNING WOODEN RINGS.

No. 389,057. Patented Sept. 4, 1888.

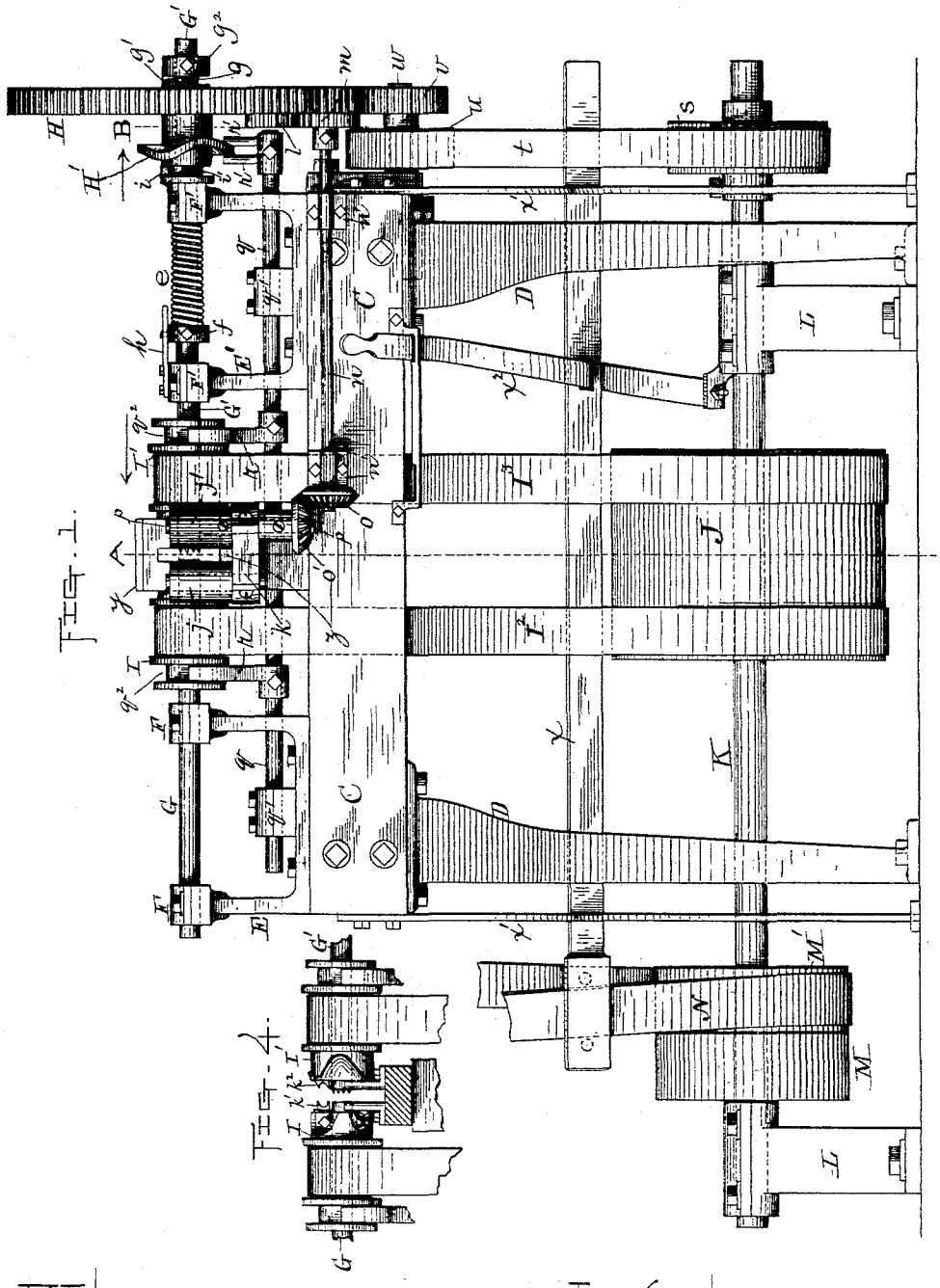


Fig. 1.

Fig. 4.

Witnesses;

Walter B. Nourse,
Lucius W. Briggs.

Inventor:

Merrill E. Clark.
By A. A. Barker, Atty.

(No Model.) 3 Sheets—Sheet 2.

M. E. CLARK.

MACHINE FOR TURNING WOODEN RINGS.

No. 389,057. Patented Sept. 4, 1888.

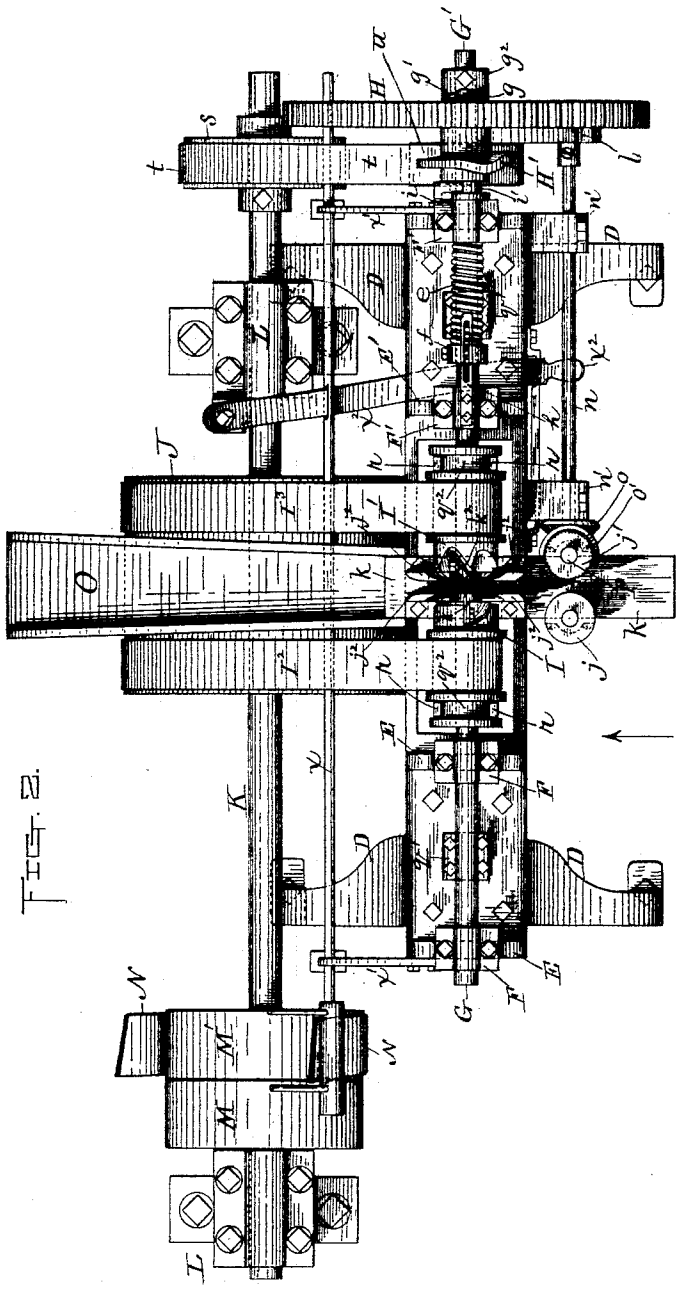


Fig. 2.

Witnesses;

Walter B. Nourse.

Lucius W. Briggs.

Inventor;

Merrill E. Clark.

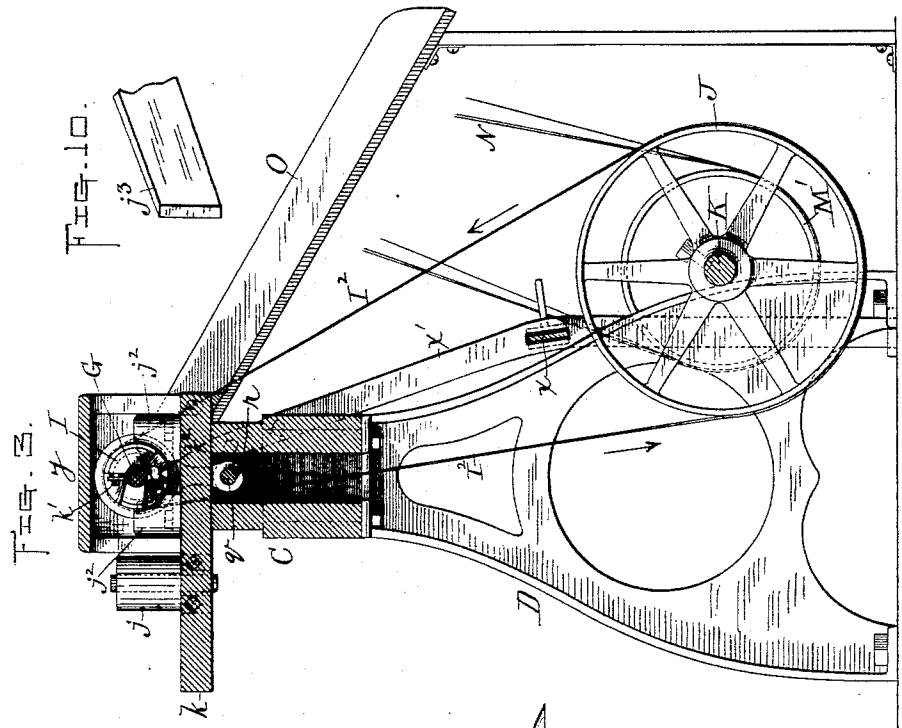
By A. A. Barker Atty

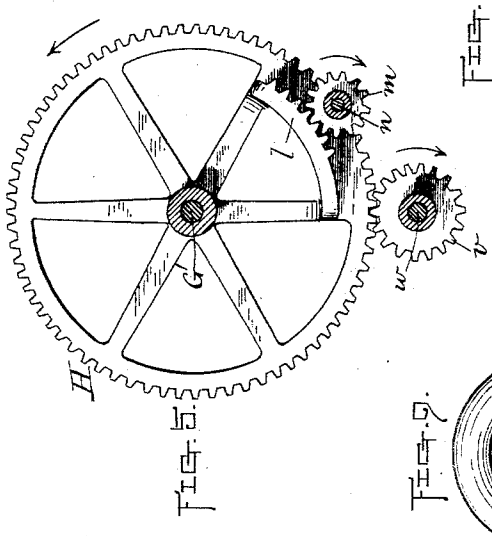
(No Model.) 3 Sheets—Sheet 3.

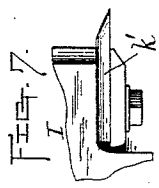
M. E. CLARK.

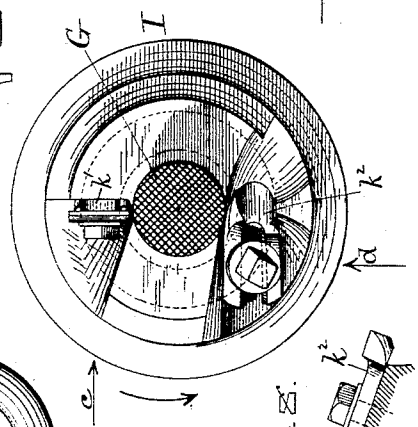
MACHINE FOR TURNING WOODEN RINGS.

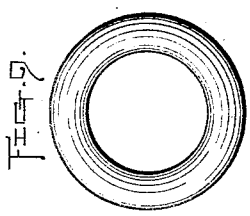
No. 389,057. Patented Sept. 4, 1888.

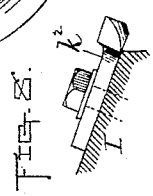












Witnesses;
Walter B. Nourse.
Lucius W. Briggs.

Inventor;
Merrill E. Clark.
By A. A. Barker. Att'y.

UNITED STATES PATENT OFFICE.

MERRILL E. CLARK, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF ONE-THIRD TO EVERETT J. BARDWELL, OF SAME PLACE.

MACHINE FOR TURNING WOODEN RINGS.

SPECIFICATION forming part of Letters Patent No. 389,057, dated September 4, 1888.

Application filed February 15, 1888. Serial No. 264,083. (No model.)

To all whom it may concern:

Be it known that I, MERRILL E. CLARK, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machines for Turning Wood Rings; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a front view of a machine embodying my improvements. Fig. 2 is a plan view thereof, with the guard over the cutters removed to more fully illustrate the parts coming under the same. Fig. 3 is a central vertical transverse section through the machine, taken on line A, Fig. 1, looking toward the left, as indicated by the arrow. Fig. 4 is a vertical longitudinal section in front of the cutters, showing a front view of said cutters and adjacent parts, with the guard above referred to removed. Fig. 5 is a transverse section on line B, Fig. 1, looking toward the right, as indicated by the arrow, same figure. Fig. 6 represents, upon an enlarged scale, an end view of one of the pulleys to which the cutters are attached and the shaft upon which it turns, all the following figures also being upon the same enlarged scale. Figs. 7 and 8 are side or edge views of the cutters shown in Fig. 6, looking in the directions of arrows *c* and *d*, respectively. Fig. 9 is a side view of an ordinary curtain-pole ring, such as is made on my machine; and Fig. 10 is a perspective view of part of a strip of wood such as the rings are made of.

My invention consists of a machine having a combined cutter-head and pulley provided with suitable cutters, one at each side of where the stock is fed in, and mechanism for imparting both rotary and horizontal longitudinal movements thereto upon their respective shafts toward and from said stock; also, having mechanism for feeding the stock forward between the cutters and for holding said stock while the cutters are acting thereon to form the rings, all by a continuous and automatic operation, as hereinafter more fully set forth.

In order that others may better understand the nature and purpose of my said invention, I will now proceed to describe the same more in detail with reference to the accompanying drawings.

The part marked C represents the bed of the machine, which is supported upon suitable frames, D D. To the top of said bed are secured the smaller frames, E E′, having bearings F F F′ F′ at their upper ends to receive and support the horizontal shafts G G′. The shaft G is, in practice, rigidly secured in its bearings, while the shaft G′ is fitted to slide longitudinally therein, and is operated toward and from the shaft G, which is in line therewith, in the following manner: It is forced toward the shaft G to hold the stock between the inner ends of the two shafts by means of a strong spiral spring, *e*, fitted over said shaft G′ and interposed between one of its bearings, F′, and a collar, *f*, secured to the shaft, and from the shaft G to release said stock by a cam, *g*, on the hub of the large driving-gear H coming against and bearing upon a cam, *g′*, formed on a collar, g^2, the latter being in turn secured to the outer end of the shaft G′. Said shaft G′ is held against rotary motion in its bearings by the slotted holding-bar *h* or its equivalent fastened to one of the bearings F′ and connected with the fixed collar *f*, and from longitudinal movement by a bar, *i*, fastened to the other bearing F′ and engaging with a peripheral groove, *i′*, in the hub of the large driving-gear H.

The strips of wood j^3, such as shown in Fig. 10, from which the rings are made, are passed in endwise, edgewise, and horizontally at right angles to the shafts G G′. They are thus fed forward automatically by means of the feed and guide rolls *j′ j*. Said rolls are arranged on a cross bed-plate, *k*, just in front of the cutters, and, in this instance, are fitted to turn horizontally at each side of the strip. The roll *j′* has a milled or roughened surface and acts as the feed-roll, and the other is smooth and acts as a friction guide-roll to hold the strip in position upon the opposite side of said strip from the feed-roll. Connection may be made from said feed-roll to the driving-gear H, so as to be turned with the latter with an intermittent motion, in any well-known way. In this instance I have shown said result as being accomplished by means of a segment-gear, *l*, on the inner side of gear H, small spur-

gear *m*, horizontal shaft *n*, bevel-gears *o o'*, and vertical shaft *p*, the feed-roll and bevel-gear *o'* being secured to shaft *p*, bevel-gear *o*, and spur-gear *m* on shaft *n*, said shaft fitted to turn in suitable bearings, *n' n'*, on bed C, and the segment-gear *l* meshing with spur-gear *m*, as shown in Figs. 1, 2, and 5 of the drawings. By said construction it is obvious that the feed-roll is operated during only a small portion of each revolution of the driving-gear H, or just sufficient to feed the stock forward the distance required to bring it in position to cut each succeeding ring therefrom.

The parts marked I I' represent the combined cutter-heads and pulleys hereinbefore alluded to, which are fitted to turn and to slide longitudinally on the inner ends of their respective shafts G G'. They are constructed and operated in the following manner: To their inner ends are fastened the cutters $k' k^2$, in substantially the position and manner shown in the drawings. In this instance only two cutters are shown; but I do not limit myself to this number. The cutter *k'* is shaped and fastened so as to cut away the stock in the form of circular grooves at each side of where the ring comes in advance of the cutter k^2, and thus prepares the way for said cutter k^2 to complete the turning operation without splitting, roughening, or otherwise injuring the stock, said cutter *k'* being provided with two outer cutting-edges with a hollow or depression between them, while the cutter k^2 is made with a curved cutting-edge across its full width of the proper shape to form the rings. (See more especially Figs. 6, 7, and 8.) Said cutters are in practice required to be made of various shapes and sizes to turn different kinds of rings, and I therefore do not limit myself to the construction shown or to the manner of fastening the same to the combined heads and pulleys I I'. The latter are rotated on their shafts by means of the endless belts I^2 I^3, preferably running in peripheral grooves formed in said pulleys, as shown, and which belts are in turn driven by means of a large pulley, J, over which they are passed. Said pulley J is fast upon shaft K, turning in suitable stationary bearings, L L, and is operated in the usual way by means of the loose and tight pulleys M M' and belt N, which latter may be connected with any suitable and convenient driving mechanism. Said combined heads and pulleys I I' are operated longitudinally by means of a cam, H', formed upon or secured to the hub of the large driving-gear H through the connecting-rod *q*, fitted to slide in stationary bearings *q' q'*, and forks *r r*, engaging at their upper ends with the peripheral grooves q^2 q^2 in said combined heads and pulleys, the forks being secured to rod *q*, and said rod provided with two pins, *r' r'*, or the equivalent thereof, between which the cam travels in its rotation. Said cam in this instance consists of a flange projecting laterally from the hub of gear H at right angles thereto for about one-half its circumference and flaring to either side in opposite directions, the remainder of its circumference in about equal proportions, or in about the form of the letter **S**, as shown in Fig. 1. By this construction it will be apparent that when the cam is rotated the rod *q* and parts connected therewith are held stationary while the straight or right-angle part of said cam is passing through the slot between the pins *r' r'*, and are operated longitudinally in first one and then the opposite direction when the curved or flaring portion is forced between said pins.

In practice the cam and other parts are so formed in relation to each other as to perform the cutting or turning operation, and then remain at rest until the stock has been fed forward to the proper position to cut the next ring therefrom. Both sets of cutters are moved forward and back together. Therefore, only one side of the stock is cut at one time, the forward movement causing one set of cutters to act upon one side of said stock, and the return or backward movement causing the other set to cut the opposite side thereof.

Driving-power may be imparted from the main shaft K to turn large gear H in any well-known way. In this instance connection is made through the pulley *s* on said shaft, endless belt *t*, pulley *u*, and small spur-gear *v*, the latter and pulley *u* being fitted to turn on a stationary stud, *w*, projecting from bed C, and the belt passed over said pulley *u* and pulley *s*, as shown in Fig. 1.

The power may be shipped and unshipped to and from the machine by means of the shipper *x* sliding in guideways *x' x'* and operated by the hinged hand-lever x^2.

In practice it is preferable to use a guard, *y*, over the cutters, as shown in Figs. 1 and 3, to protect the attendant from injury by said cutters, as well as dust and particles of wood thrown out thereby, said guard also serving to hold the stock in position at the top. It is also preferable to use a strip or bar, *z*, the width of the stock, arranged transversely of the machine under the cutters to support the stock upon the under side. The stock is held in position laterally by means of two pairs of stationary guides, j^2 j^2, one pair being arranged in front of the cutters and the other at the back thereof at each side of where the stock is fed through, as shown in Figs. 2 and 3. As the rings are finished they drop forward from the cutters and pass down over the inclined trough O into any suitable receptacle which may be placed underneath to receive them.

The operation of the machine may be briefly summed up as follows: Assuming that a ring has just been finished and the shaft G' moved back to allow the stock to be fed forward to cut the next succeeding ring therefrom, said feeding operation is first performed by turning the feed-roll *j'*, as previously described. Upon the blank strip or stock having been thus fed forward to the proper point the shaft G' is released and allowed to be sprung forward by its

spring *e*, so as to hold said strip in position. To facilitate the holding thereof, the inner end of the stationary shaft G may be milled or roughened, as shown in Figs. 3 and 6, and the forward or inner end of said shaft G′ provided with spurs, as shown in Figs. 1, 2, and 4. The shaft G′ having been thus sprung forward for the above purpose, the combined cutter-heads and pulleys I I′ (which, by the way, turn continuously) are moved forward and back together by the cam H′ through suitable connections, as previously described, and thereby causes the cutters thereon to cut first one side and then the other of the ring, which, when it is severed from the strip, drops forward and down over the trough O into a suitable receptacle underneath, as also previously described. The ring being now completed and disposed of, the shaft G′ is forced back by the cam *g* on the hub of gear H coming into engagement with the cam *g′* on said shaft G′, when the strip is again fed forward, and the foregoing operation repeated in making the next and each succeeding ring.

In practice the various parts are so constructed as to pass through the different stages of forming the rings by a continuous and automatic operation. It is therefore obvious that the production is greatly augmented over the usual methods employed, while at the same time the rings thus produced are of a superior quality of finish, owing to the construction and disposition of the cutters, as hereinbefore described, and shown in the drawings, which results have been fully demonstrated in practice in the manufacture of many thousands of rings on machines made in accordance with my invention.

Although said invention is designed more especially for turning wood rings, as hereinbefore specified, the same may be applied to other similar purposes, if desired, without departing from the principle thereof. As, for instance, it may be used for forming turned rosettes upon opposite sides of a block of wood or upon separate pieces placed together, such as are commonly employed in building finish and similar purposes, by simply changing the shapes of the cutters and modifying other parts of the machine to correspond therewith.

If desired, the connections between the large gear H and main driving-shaft K may be dispensed with and said gear turned by hand to operate the slide-shaft G′, in which case it would also be preferable to leave off the automatic feed mechanism and feed in the stock or strips of wood *j*³ also by hand, said gear H under such circumstances being provided with an operating-handle similar to that of an ordinary hand-lathe.

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

1. In a wood-turning machine, a pair of combined cutter-heads and pulleys arranged in line horizontally lengthwise of said machine, one at each side of where the stock is fed in, and provided with one or more cutters at their inner ends, also having independent continuous rotary movements, and moving together longitudinally with intermittent reciprocating movements independent of their aforesaid rotary movements, whereby first one side and then the other of said stock is acted upon by the cutters thereof, one of said combined cutter-heads and pulleys being fitted and arranged to operate upon a stationary shaft and the other upon a slide-shaft, and both of said shafts having stationary supports, substantially as and for the purpose set forth.

2. In a machine for turning wood rings, a pair of combined cutter-heads and pulleys arranged in line horizontally lengthwise of said machine, one upon each side of where the stock is fed in, and provided with one or more cutters at their inner ends, also having independent continuous rotary movements, and moving together longitudinally with intermittent reciprocating movements independent of their said rotary movements, whereby first one side and then the other of said stock is acted upon by the cutters thereof, one of said combined cutter-heads and pulleys being fitted and arranged to operate upon a stationary shaft and the other upon a slide-shaft, and both of said shafts having stationary supports, in combination with said shafts and their supports, means, substantially as described, for imparting a continuous rotary motion to said combined cutter-heads and pulleys, and means for also imparting longitudinal reciprocating intermittent movements thereto, substantially as and for the purpose set forth.

3. In a machine for turning wood rings, a pair of combined cutter-heads and pulleys provided with one or more cutters at their inner ends, and having both rotary and longitudinal movements upon the inner ends of two horizontal shafts arranged in the same line lengthwise of the machine and at a short distance apart, one of the shafts being stationary and the other fitted to slide longitudinally in its bearings, in combination with said shafts and their supports, mechanism, substantially as described, for imparting longitudinal intermittent reciprocating movements to said slide-shaft, mechanism, substantially as described, for imparting a continuous rotary motion to the combined cutter-heads and pulleys on their respective shafts, and mechanism, substantially as described, for also moving said combined cutter-heads and pulleys together longitudinally upon said shaft with reciprocating intermittent movements, all by a continuous and automatic operation, for the purpose set forth.

4. In a machine for turning wood rings, a pair of combined cutter-heads and pulleys provided with one or more cutters at their inner ends, and having both rotary and longitudinal movements upon the inner ends of two horizontal shafts arranged in the same line lengthwise of said machine and at a short dis-

tance apart, one of said shafts being stationary and the other fitted to slide longitudinally in its bearings, in combination with said shafts and their supports, mechanism, substantially as described, for imparting longitudinal intermittent reciprocating movements to said slide-shaft, mechanism, substantially as described, for feeding the stock or strips from which the rings are made forward between the cutters at about right angles thereto with an intermittent motion, mechanism, substantially as described, for imparting a continuous rotary motion to the combined cutter-heads and pulleys on their respective shafts, and mechanism, substantially as described, for also moving said combined cutter-heads and pulleys together longitudinally upon said shafts with reciprocating intermittent movements, all by a continuous and automatic operation, for the purpose set forth.

5. The combination of the stationary shaft G, slide-shaft G′, and their supports, with fixed collar *f* on shaft G′, spring *e* interposed between said collar and one of the bearings of said shaft, means, substantially as described, for preventing shaft G′ from turning in its bearings, large spur-gear H and collar g^2, provided, respectively, with the cams *g* and *g′*, and means for preventing longitudinal movement of said gear H on shaft G′, substantially as and for the purpose set forth.

6. The combination of the stationary shaft G, slide shaft G′, and their supports, and the combined cutter heads and pulleys I I′, provided with one or more cutters at their inner ends, also fitted to turn and to slide longitudinally one upon the inner end of each shaft G G′, with endless belts I^2 I^3, large pulley J on the main driving shaft, forks *r r*, projecting up from horizontal shaft *q* into the peripheral grooves q^2 q^2 of said combined cutter-heads and pulleys I I′, said shaft *q* having the pins *r′ r′* or the equivalent thereof at its outer end and fitted to slide in suitable bearings, and driving-gear H on shaft G′, provided with the cam H′, adapted to pass through the slot between said pins *r′ r′*, substantially as and for the purpose set forth.

7. The combination of the stationary shaft G, slide-shaft G′, and their supports, and the combined cutter-heads and pulleys I I′, provided with one or more cutters at their inner ends, mounted one upon the inner end of each of said shafts G G′, and operating, substantially as described, with the friction-roll *j*, feed-roll *j′*, their supports, cross bed-plate *k*, bevel-gears *o′ o*, vertical shaft *p*, horizontal shaft *n*, turning in suitable stationary bearings, small spur-gear *m*, and segment-gear *l* on large spur-gear H, substantially as and for the purpose set forth.

8. The combination of the stationary shaft G, slide-shaft G′, and their supports, and the combined cutter-heads and pulleys I I′, provided with one or more cutters at their inner ends, mounted one upon the inner end of each of said shafts G G′, and operating substantially as described, with the stationary guides j^2, arranged in front and back of the cutters at each side of where the stock is fed in, cross bed-plate *k*, and inclined trough O, substantially as and for the purpose set forth.

9. The combination of the stationary shaft G, slide-shaft G′, and their supports, and the combined cutter-heads and pulleys I I′, provided with one or more cutters at their inner ends, mounted one upon the inner end of each of said shafts G G′, and operating substantially as described, with the rotary friction and feed rolls *j j′*, their supports, stationary guides j^2, arranged in front and back of the cutters at each side of where the stock is fed in, cross bed-plate *k*, and inclined trough O, substantially as and for the purpose set forth.

10. The combination of the stationary shaft G, slide-shaft G′, and their supports, and the combined cutter-heads and pulleys I I′, provided with one or more cutters at their inner ends, mounted one upon the inner end of each of said shafts G G′, and operating substantially as described, with the rotary friction and feed rolls *j j′*, their supports, stationary guides j^2, arranged in front and back of the cutters at each side of where the stock is fed in, cross bed-plate *k*, supporting-strip *z* or its equivalent, top guard, *y*, and inclined trough O, substantially as and for the purpose set forth.

MERRILL E. CLARK.

Witnesses:
A. A. BARKER,
W. B. NOURSE.