

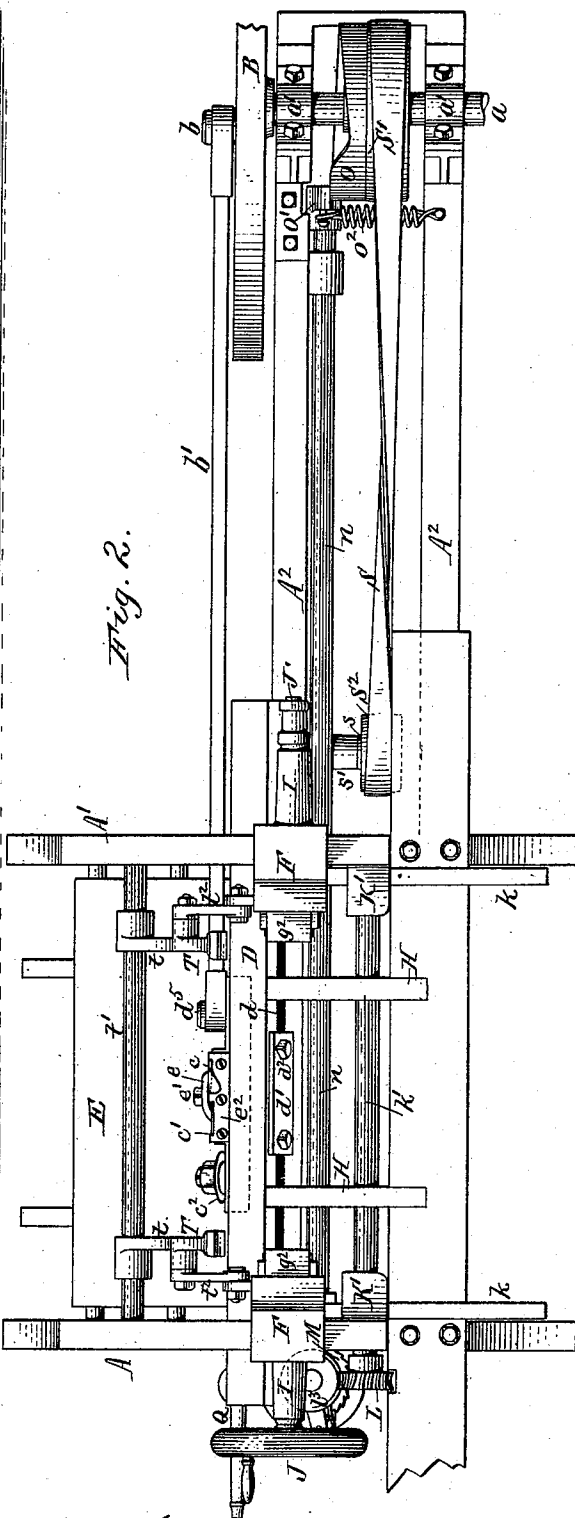
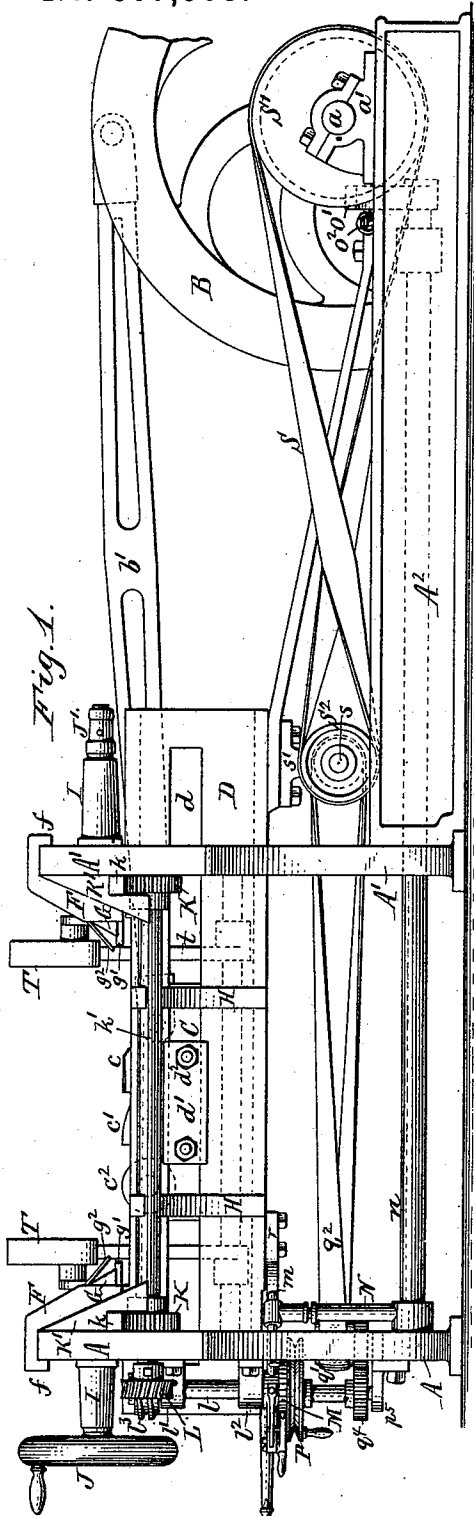
(No Model.)

4 Sheets—Sheet 1.

J. NAYLOR, Jr.
HOOP CUTTING MACHINE.

No. 507,503.

Patented Oct. 24, 1893.



Chas. Buchheit.
Thos. L. Popp. } Witnesses.

James Naylor Jr. Inventor.
By Wilhelm Honner. Attorneys

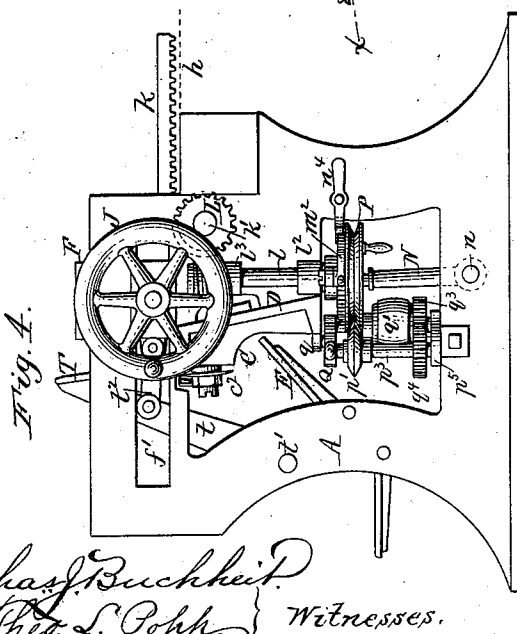
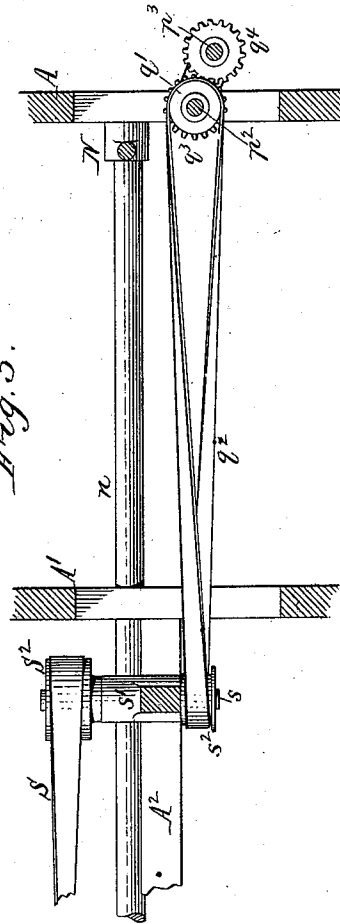
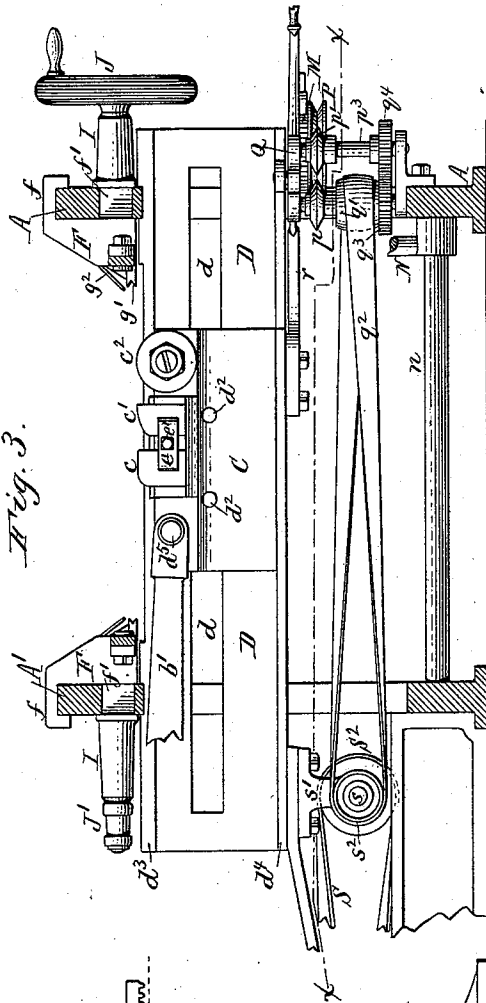
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James Naylor Jr. Inventor.
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Attorneys.

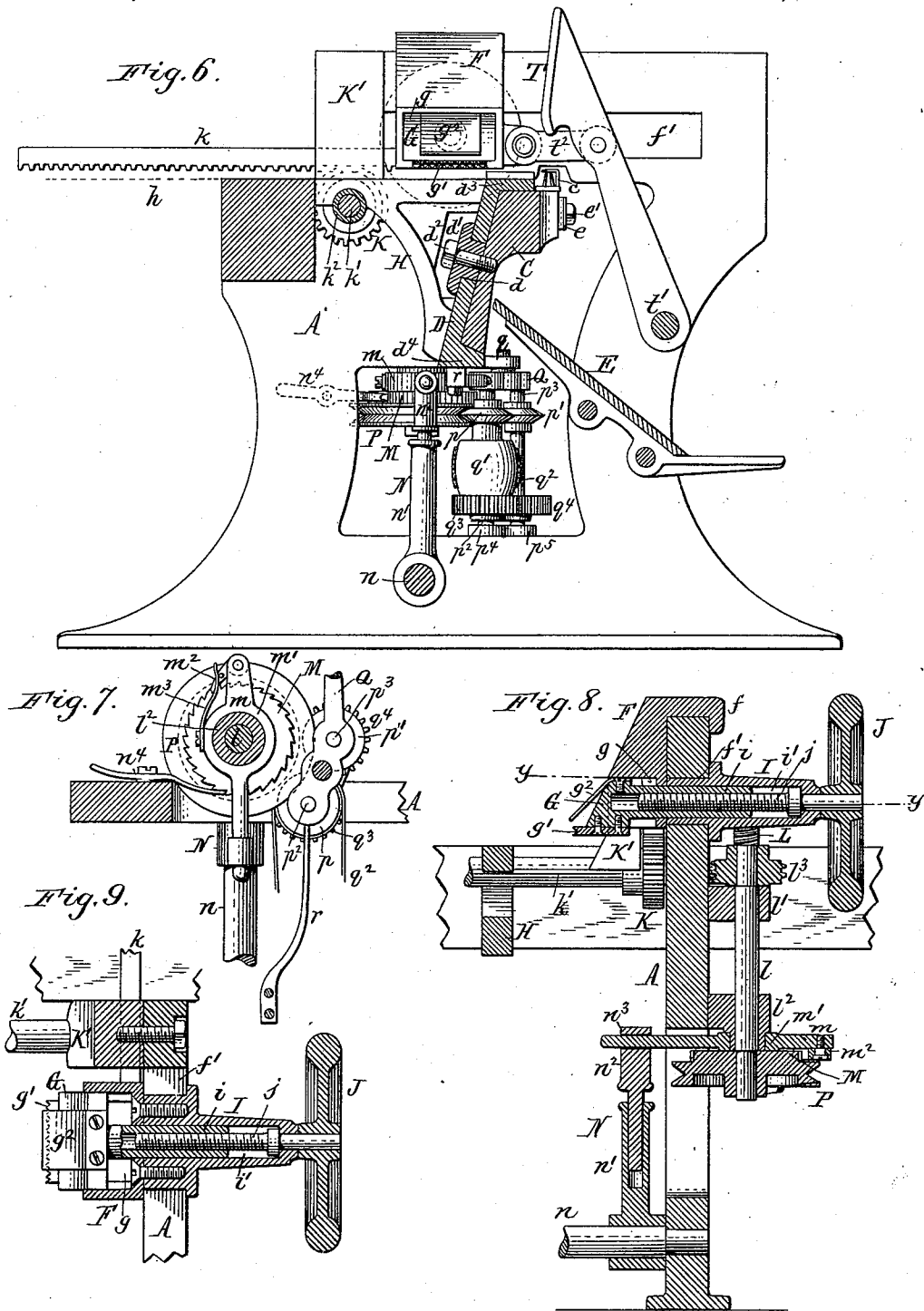
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4 Sheets—Sheet 3.

J. NAYLOR, Jr.
HOOP CUTTING MACHINE.

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Patented Oct. 24, 1893.



Chas. J. Buchheit.
Theodore L. Popp. } Witnesses.

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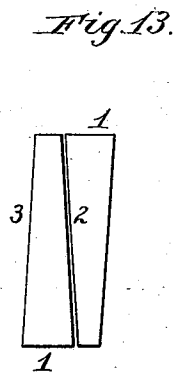
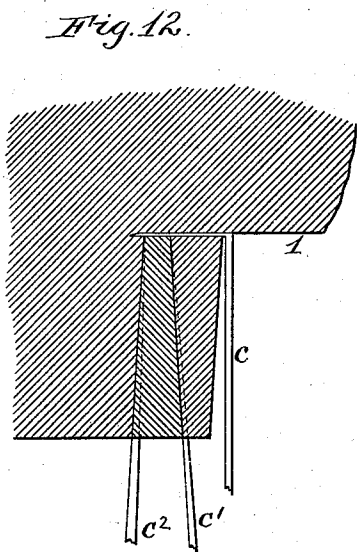
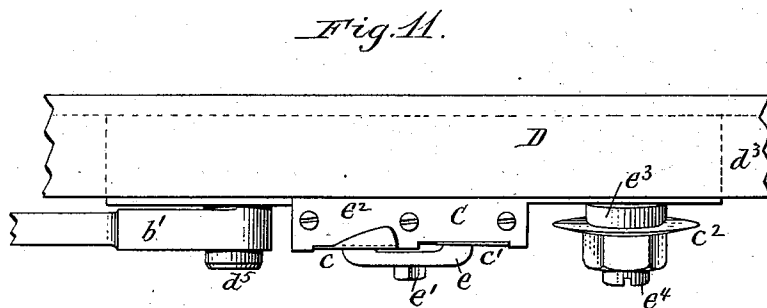
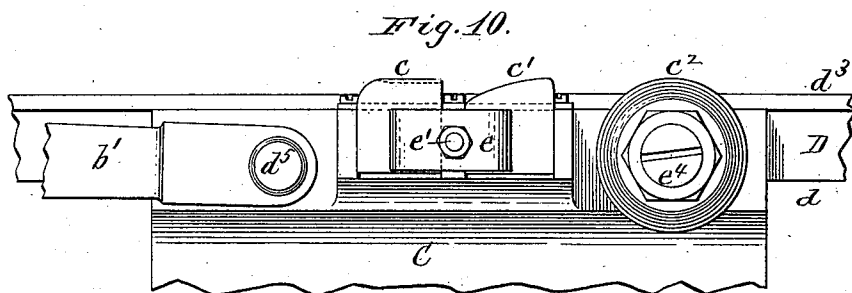
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4 Sheets—Sheet 4.

J. NAYLOR, Jr.
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Patented Oct. 24, 1893.



Witnesses:

Chas. J. Buchheit.
Theodore L. Popp.

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Attorneys

UNITED STATES PATENT OFFICE.

JAMES NAYLOR, JR., OF POUGHKEEPSIE, ASSIGNOR TO BURRELL & WHITMAN, OF LITTLE FALLS, NEW YORK.

HOOP-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,503, dated October 24, 1893.

Application filed January 7, 1887. Serial No. 223,641. (No model.)

To all whom it may concern:

Be it known that I, JAMES NAYLOR, Jr., of the city of Poughkeepsie, in the county of Dutchess and State of New York, have invented new and useful Improvements in Hoop-Cutting Machines, of which the following is a specification.

This invention relates to a machine for cutting hoop blanks from logs and has for its object to produce a machine by which hoop blanks are produced expeditiously and with a minimum waste of material, and which permits logs of comparatively small diameter to be economically cut up into hoop blanks.

My invention relates more particularly to a machine in which the knives or cutters are attached to a reciprocating carriage and in which the log is moved across the path of the knives by a rectilinear feed motion.

My invention consists of the improvements which will be hereinafter fully described and pointed out in the claims.

In the accompanying drawings consisting of four sheets: Figure 1 is a rear elevation of the machine. Fig. 2 is a top plan view thereof. Fig. 3 is a fragmentary front elevation of the machine. Fig. 4 is an end elevation thereof. Fig. 5 is a horizontal section in line $x-x$, Fig. 3. Fig. 6 is a vertical cross section of the machine on an enlarged scale. Fig. 7 is a horizontal section showing the ratchet wheel of the feed mechanism and connecting parts. Fig. 8 is a vertical section through one of the head blocks and part of the feed mechanism. Fig. 9 is a horizontal section in line $y-y$, Fig. 8. Fig. 10 is a front elevation of the knife carriage on an enlarged scale. Fig. 11 is a top plan view thereof. Fig. 12 is a vertical section showing the relative position of the three knives. Fig. 13 is a vertical section of two hoop blanks cut from the log during the same stroke of the knife carriage.

Like letters and numerals of reference refer to like parts in the several figures.

$A A'$ represents the upright side frames of the machine arranged at right angles to the path of the knives and connected by suitable stays.

A^2 represents a horizontal bed frame resting on the floor or other support upon which

the side frames $A A'$ are supported and extending outwardly from the side frame A' parallel with the path of the knives.

a represents the horizontal driving shaft arranged transversely above the outer end of the bed frame A^2 and journaled in bearings a' secured to the same. Power is applied to the shaft a by a belt or other suitable means.

B represents a fly wheel secured to the front end of the driving shaft a , and b is a wrist pin secured to said wheel near its periphery.

b' represents the connecting rod or pitman which connects the wrist pin b with the sliding holder or carriage C to which the knives or cutters c, c', c^2 are attached.

D represents a horizontal guide bar arranged at right angles to the side frames $A A'$ and secured to the same in upright openings formed in the side frames. The guide bar D leans over forwardly or has its upper edge arranged in advance of its lower edge, as represented in Figs. 4 and 6.

d represents a longitudinal slot formed in the guide bar D and d' is a guide block fitted in said slot to slide therein and provided on its rear side with flanges which bear against the rear side of the guide bar D above and below said slot. The block d' is secured to the rear side of the knife carriage C by a bolt d^2 . The guide bar D is provided on its front side with longitudinal top and bottom flanges or ribs $d^3 d^4$ which bear respectively against the upper and lower sides of the knife carriage, while the rear side of the latter bears against the front side of the guide bar D . The knife carriage is guided by these devices in its reciprocating movements and is protected by the overhanging top portions of the guide bar against the chips, dust, &c., which are formed in cutting the hoop blanks.

d^5 represents a pin secured to the knife carriage C and connected with the connecting rod b' for transmitting motion to the knife carriage. The pin d^5 is arranged near the upper edge of the knife carriage and the latter is arranged nearly in line with the highest position of the wrist pin b on the fly wheel B , so that the connecting rod remains nearly horizontal while the knife carriage travels along the guide bar D toward the shaft a in performing the cutting stroke. A direct or

nearly straight pull is thus applied to the carriage during its effective stroke, whereby the friction of the carriage against the guide bar is reduced to a minimum during the operation of cutting.

The first knife *c* has its cutting lip bent rearwardly and horizontally and cuts into the log horizontally, forming the cut marked 1, in Fig. 12. The second knife *c'* is inclined forwardly or approaches the face of the log from its base to its upper edge, so as to form a forwardly inclined cut marked 2, in Fig. 13. The third knife *c²* is inclined rearwardly or recedes from the face of the log from its base to its upper edge so as to form a rearwardly inclined cut marked 3, in Fig. 13. The three cuts marked 1, 2, 3 are formed successively by the knives *c c' c²*, in the order named and sever two hoop blanks from the log during the same cutting stroke of the knife carriage. Each hoop blank has both of its sides inclined at an acute angle to its large end, whereby the operation of dressing the hoops is greatly expedited and effected with less loss of material than is the case when one of the sides stands at right angles to the large end of the blank. The knives *c, c'* are secured to the face of the carriage *C* near the upper edge thereof by a cap *e* and bolt *e'*. The knives are held against longitudinal displacement by a notched plate *e²* secured to the upper edge of the carriage *C*. The knife *c²* is preferably a rotary or disk knife secured to a sleeve *e³* which turns upon an arbor *e⁴* projecting from the front side of the carriage *C*. This rotary or rolling knife is the trailing knife and severs the second blank from the log. The rolling action of this knife causes the blank to drop straight down as the knife leaves the log and prevents the knife from carrying the blank with it as it moves beyond the log.

E represents the inclined receiving table secured between the side frames *A A'* below the knife carriage and receiving the blanks as they are cut from the log.

F F represent the head blocks between which the log is clamped and by which it is fed to the knives. These head blocks are mounted on the inner side of the upper portions of the side frames *A A'* and are guided thereon so as to move horizontally and at right angles with the path of the knives and above the plane of the latter. Each head block is provided with a hook *f* which extends over and rests on the horizontal upper edge of the adjacent side frame. Each side frame is provided above the guide bar *D* with a horizontal slot *f'* in which the head block is guided. Each head block is provided on its inner face with a recess *g* in which is fitted a block *G* so as to be capable of moving in the recess *g* toward and from the opposite head block. Each block *G* is provided on its under side with an inwardly projecting serrated plate *g'* which is adapted to bite into the end

of the log. Each block *G* is provided with an inclined face and with a spring plate *g²* secured with its upper edge to the top of the block *G* and projecting in an inclined position downwardly over the face of the block *G*, as represented in Fig. 8. The spring plates *g²* terminate above the serrated plates *g'* and stand with their lower edges at a short distance from the inclined faces of the blocks *G* in advance of the serrated plate *g'*.

H H represent brackets secured to the rear side of the guide bar *D* and provided with horizontal upper edges upon which the log is supported. The upper sides of these brackets are arranged in line with the floor — *h* — upon which the logs are rolled to the machine. By pressing the head blocks against the ends of the log the springs *g²* are deflected downwardly, whereby the log is pressed firmly against the supporting brackets *H* and the serrated plates *g'* secure a firm hold in the ends of the log.

During the first part of the movement of the head blocks *G* toward the ends of the log, the free ends of the springs *g²* are embedded in the ends of the log, and upon continuing to move the head blocks toward the log, to secure the same by the serrated plates *g'*, the springs *g²* are deflected downwardly, and thereby exert a downward pressure upon the ends of the log and firmly press the same against the brackets *H*. Upon releasing the head blocks the springs *g²* press against the ends of the log and cause the serrated plates to become disengaged from the log.

Each block *G* is provided on its rear side with a horizontal tubular shank *i* which extends into a sliding block *I* fitted in the groove *f'* of the adjacent side of the frame. The block *I* is provided with a socket *i'* in which the tubular shank is seated and in which is arranged an adjusting screw *j* which is held against longitudinal movement in the outer portion of the socket while its threaded inner portion works in an internal thread formed in the tubular shank *i*, so that by turning the screw *j* the block *G* will be moved in the recess *g* of the head block as may be necessary to clamp or release the log. The outer end of the set screw *j* may be provided with a hand wheel *J* or with a sleeve *J'* for turning the same.

In the drawings the screw at the end of the machine is shown as being provided with a hand wheel *J* and the screw near the middle of the machine with a sleeve *J'*.

k k represent horizontal rack bars secured to the head blocks and extending rearwardly therefrom on the inner sides of the side frames *A A'* and parallel with the latter.

k' represents the horizontal feed shaft arranged at right angles to the rack bars *k* below the latter and journaled in bearings formed in the side frames.

K K represent gear wheels secured to the shaft *k'* and meshing with the rack bars *k* so

that by turning the shaft k' the head blocks F are simultaneously moved toward or from the knives.

5 K' K' represent inclined cheek pieces secured to the inner sides of the side frames A A' and covering the gear wheels K and the adjacent portions of the shaft k' and rack bars k . The shaft k' may be protected by a tubular covering k^2 .

10 L represents a worm wheel secured to the end of the feed shaft k' on the outer side of the side frame A.

l represents a vertical shaft arranged on the outer side of the side frame A and journaled in bearings l' l^2 secured thereto.

15 l^3 is a worm secured to the upper end of the shaft l and meshing with the worm wheel L.

M is a horizontal ratchet wheel secured to the lower end of the shaft l and m is a pawl lever resting on the ratchet wheel M and pivoted concentric therewith by a ring m' which turns on an extension of the lower bearing l^2 , as clearly shown in Fig. 7.

20 m^2 is a pawl which is pivoted to the short outer arm of the lever m and is held in engagement with the teeth of the ratchet wheel by a spring m^3 secured to the lever m . The pawl lever m is oscillated by a vertical rock arm N which is secured to a horizontal rock shaft n . The arm N is composed of a lower part n' secured to the shaft n and provided with a vertical cylindrical socket and an upper part n^2 provided with a cylindrical shank fitting in said socket. The upper part n^2 is 30 provided with an eye n^3 in which the long arm of the pawl lever m plays, as represented in Fig. 8. These parts form a swiveling connection between the rock arm N and the pawl lever and transmit motion freely from the 40 rock shaft to the pawl lever.

n^4 is a detent spring arm or pawl pivoted to the side frame A and engaging with the ratchet wheel M so as to prevent retrograde movement of the same. The spring arm or pawl n^4 is 45 sufficiently elastic or yielding to ride over the teeth of the ratchet wheel M when the latter is rotated. The pawl n^4 is pivoted near its center, as shown in Figs. 6 and 7, and can be readily disengaged from the ratchet wheel, 50 by swinging the pawl upon its pivot until its inner end is disengaged from the ratchet wheel M.

The rock shaft n extends through the bed frame A² and terminates near the driving 55 shaft a from which it is actuated by a cam O secured to the shaft a and an arm O' which is secured to the shaft n and is held against the cam by a spring O². The cam O is so shaped and arranged on the shaft a that the 60 rock shaft is caused to effect the feeding or forward movement of the pawl lever quickly after the knives have cleared the end of the log and before the knives have reached the log on their forward stroke, while the return 65 movement of the pawl lever is effected slowly.

P represents a friction rim or wheel of V-

shaped or other suitable cross section formed on or secured to the ratchet wheel M.

p and p' represent two friction wheels either of which may be placed in contact with the 70 friction wheel P and which rotate in opposite directions. The wheels p p' are secured respectively to the upper ends of two upright shafts p^2 p^3 which are supported with their lower ends in step bearings p^4 p^5 loosely so as 75 to permit of the requisite movement of the friction wheels p p' . These bearings are attached to the lower portion of the side frame A. The upper ends of the shafts p^2 p^3 are journaled in a lever Q which is attached to 80 the under side of the guide bar D by a vertical pivot q arranged between the bearings of the shafts p^2 p^3 , so that by swinging the lever on its pivot the upper ends of the two shafts are moved in opposite directions there- 85 by bringing one of the wheels p p' in contact with the wheel P and removing the other wheel therefrom. The lever Q extends outwardly from the side frame A in convenient reach of the operator. The shaft p^2 is pro- 90 vided with a pulley q' and is rotated by a belt q^2 running around said pulley. This motion is transmitted from the shaft p^2 to the shaft p^3 in a reversed direction by a pair of gear wheels q^3 q^4 mounted upon said shafts. 95

r represents a spring secured to the guide bar D and connected with the lever Q so as to hold the latter in the position in which both wheels p p' are out of contact with the wheel P. The outer free end of the spring r en- 100 engages in a socket formed in the inner end of the lever Q, and does not exert a tension on the lever Q in either direction, when both friction wheels p p' are disengaged from the 105 wheel P, but simply serves to retain the parts in this disengaged position when the lever Q is released.

s represents a horizontal countershaft arranged on the outer side of the side frame A' 110 above the bed frame A² and supported in a bearing s' which is secured to the lower side of the guide bar D. This countershaft is rotated from the driving shaft a by a crossed belt S running around pulleys S' S² on the re- 115 spective shafts and communicates motion to the vertical shaft p^2 by the belt q^2 running around a pulley s^2 on the counter shaft and the pulley q' on the shaft p^2 .

T T represent stops arranged above the knives and provided with arms t which are 120 hung with their lower ends upon a horizontal rod t' connecting the side frames A A' above the receiving table. These stops are connected with the head blocks F by links t^2 so as to take part in the movement of the head 125 blocks. The stops T limit the movement of the log when the latter is rolled upon the supporting brackets H and hold the log in the proper position to be clamped between the head blocks.

130 Upon disengaging the pawls m^2 and n^4 from the ratchet wheel M the oscillating movement

of the pawl lever causes no movement of the ratchet wheel and the automatic feed mechanism is consequently rendered inoperative for the time being. The vertical shaft l can now be revolved in either direction at the will of the operator by taking hold of the lever Q and pressing either of the friction wheels p p' against the friction wheel P . This causes a corresponding movement of the horizontal feed shaft k' , whereby the head blocks are moved toward or from the knives as may be desired. The machine is thus provided with a feed mechanism whereby the head blocks can be moved in either direction by power at the will of the operator and with an automatic feed mechanism whereby the head blocks are moved toward the knives at regular intervals. The automatic feed mechanism moves the log horizontally over the path of the knives and the latter sever the blanks from the under side of the log in successive pairs until the log has been fed past the knives. The automatic feed mechanism is now thrown out of gear, as described, the log is run back beyond the knives by the friction mechanism, the head blocks are disengaged from the log whereby the latter is lowered upon the brackets H , the log is again clamped between the head blocks, the automatic feed mechanism is thrown into gear and the operation of cutting repeated. In this manner the hoop blanks are cut in successive horizontal layers or tiers from the under side of the log until the latter is exhausted. The blanks produced in this manner are all alike as to the angle of their sides and differ in this respect from the blanks produced by a cutting around the log which changes their angle continuously as the cut approaches the center of the log. The blanks are also produced with less waste of material and logs of comparatively small diameter can be profitably used in the production of hoops.

I claim as my invention—

1. The combination with the head block provided with a biting edge and a bed upon which the log rests, of an inclined spring projecting from the face of the head block and holding the log against the supporting bed in tightening the head block, substantially as set forth.

2. The combination with the head block provided in its face with a recess g , of a sliding block G arranged in said recess and held against turning therein, an inwardly projecting biting plate g' secured to the sliding

block G , and a spring plate g^2 also secured to the sliding block G in advance of the biting plate g' , substantially as set forth.

3. The combination with the reciprocating knife carriage, of movable head blocks, guides upon which the head blocks move across the path of the knife carriage, and movable stops T connected with the head blocks and moving therewith, substantially as set forth.

4. The combination with the reciprocating knife carriage, of sliding head blocks, guides upon which the head blocks move across the path of the knife carriage, pivoted stops T and links t^2 connecting said stops with the head blocks, substantially as set forth.

5. The combination with the side frames A A' , of the longitudinal guide bar D provided with a longitudinal slot d , a knife carriage C fitted against the front side of said guide bar, a sliding block fitted in the slot d and bearing against the rear side of the guide bar, and a bolt d^2 connecting the sliding block with the knife carriage, substantially as set forth.

6. The combination with the cutting mechanism, the movable log supports, and the feed shaft, of a vertical shaft l geared with the feed shaft, a ratchet wheel M secured to the shaft l , a pawl lever m , a rock shaft n , a rock arm N connecting the rock shaft with the pawl lever by a swiveling connection, and a cam whereby said rock shaft is actuated, substantially as set forth.

7. The combination with the cutting mechanism, the movable log supports and the feed shaft, of a vertical shaft l geared with the feed shaft, a friction wheel P , mounted on said shaft l , friction wheels p p' mounted on shafts p^2 p^3 , rotating in opposite directions, a lever Q in which said shafts are journaled, and a spring r whereby both wheels p p' are held out of engagement with the wheel P , substantially as set forth.

8. The combination with the log supports, the reciprocating knife carriage and the rectilinear guide upon which the knife carriage moves, of a rolling knife which is attached to the knife carriage and whereby the side of the blank is cut from the log, and a knife by which the edge of the blank is cut, substantially as set forth.

Witness my hand this 29th day of December, 1886.

JAMES NAYLOR, JR.

Witnesses:

WM. P. MALONEY,
C. VAN VIGHTON.