(No Model.) 4 Sheets—Sheet 1.

A. B. IRELAND.

MACHINE FOR CUTTING SHINGLES.

No. 342,017. Patented May 18, 1886.

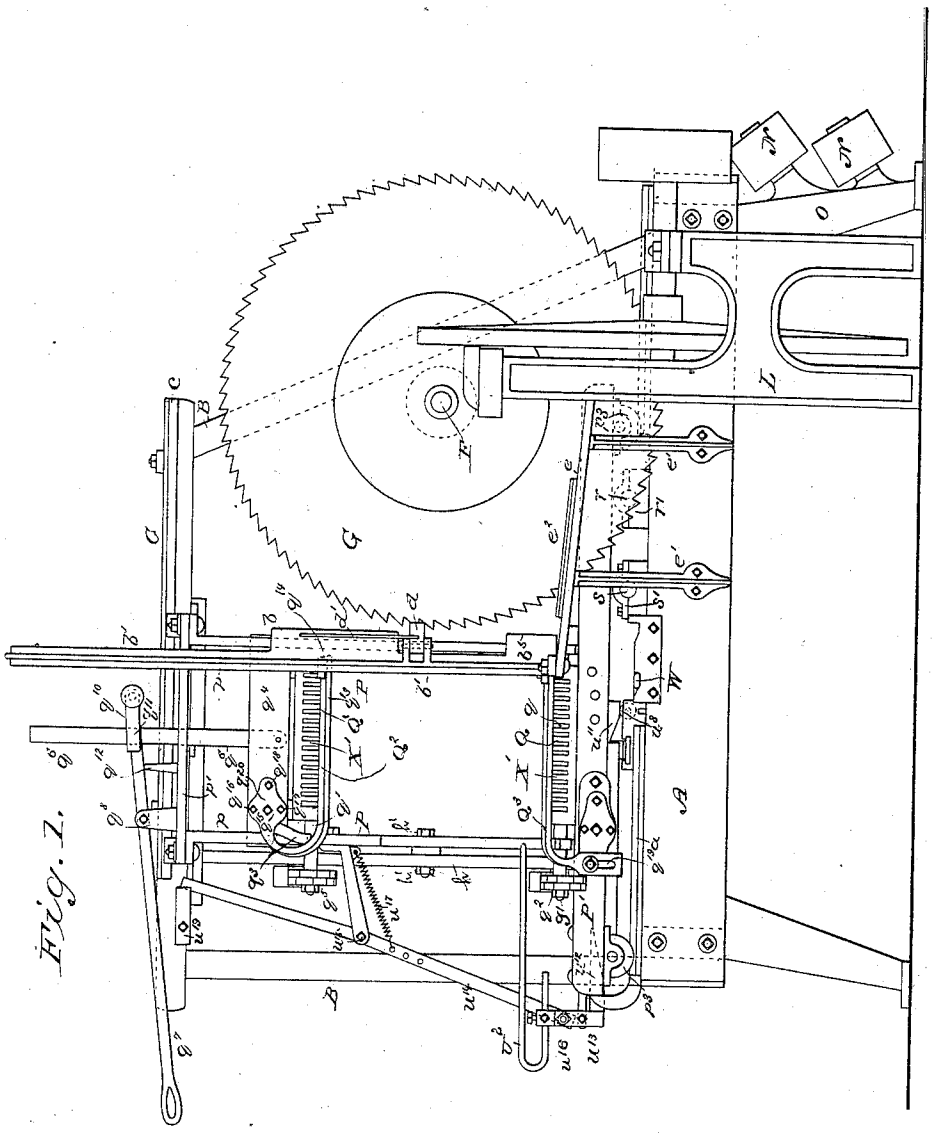


Fig. 1.

WITNESSES

Ed. A. Newman
Al. C. Newman.

INVENTOR

A. Bertsell Ireland,
By his Attorneys
Baldwin, Hopkins & Peyton

(No Model.) 4 Sheets—Sheet 2.

A. B. IRELAND.

MACHINE FOR CUTTING SHINGLES.

No. 342,017. Patented May 18, 1886.

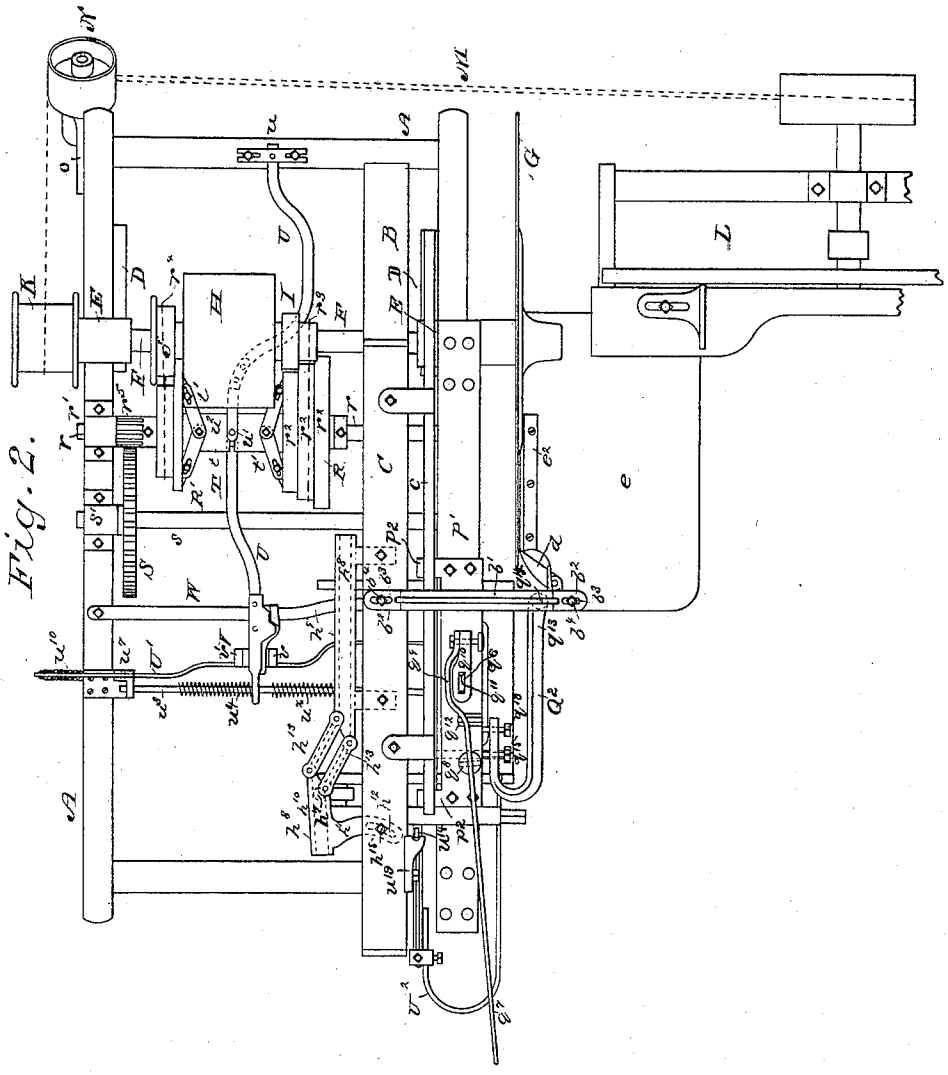


Fig. 2.

WITNESSES

Ed. A. Newman.
Al. C. Newman.

INVENTOR

A. Bertsell Ireland,
By his Attorneys
Baldwin Hopkins & Peyton

(No Model.) 4 Sheets—Sheet 3.

A. B. IRELAND.

MACHINE FOR CUTTING SHINGLES.

No. 342,017. Patented May 18, 1886.

Fig. 4.

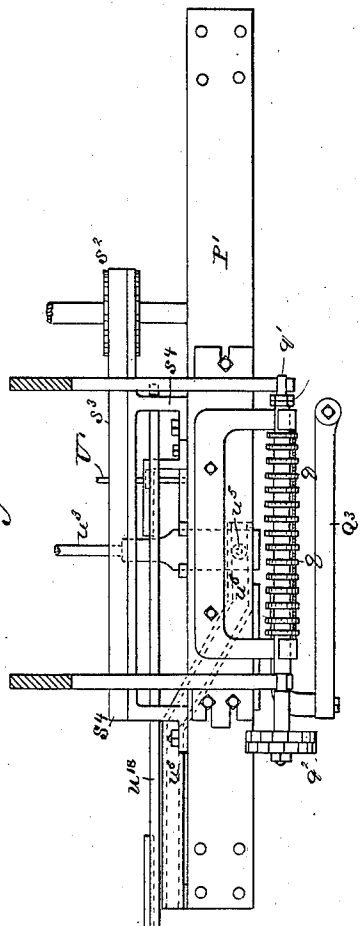


Fig. 5.

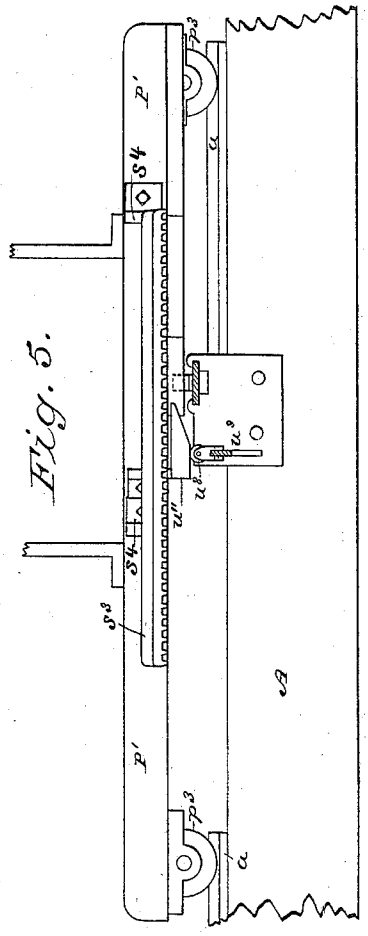
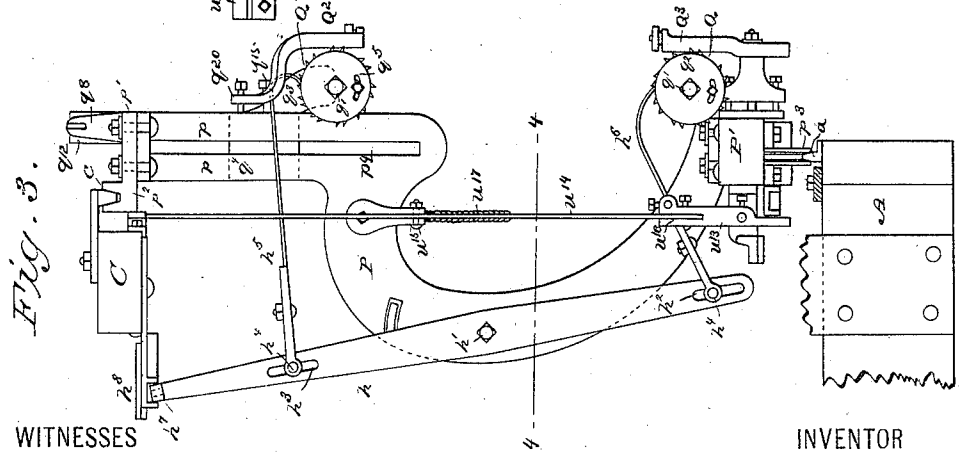


Fig. 3.



WITNESSES

Ed. A. Newman,
Al. C. Newman.

INVENTOR

A. Bertsell Ireland

By his Attorneys

Baldwin, Hopkins & Peyton.

(No Model.) 4 Sheets—Sheet 4.

A. B. IRELAND.

MACHINE FOR CUTTING SHINGLES.

No. 342,017. Patented May 18, 1886.

Fig. 6.

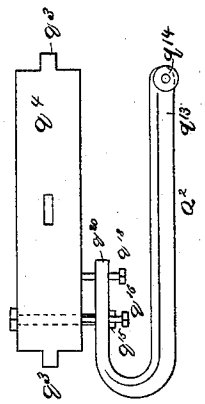


Fig. 8.

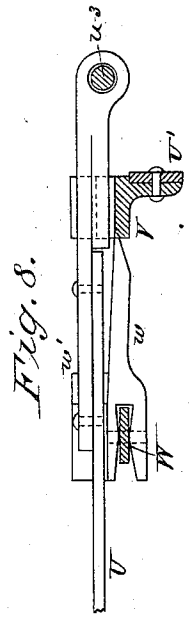


Fig. 9.

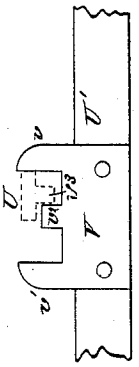


Fig. 7.

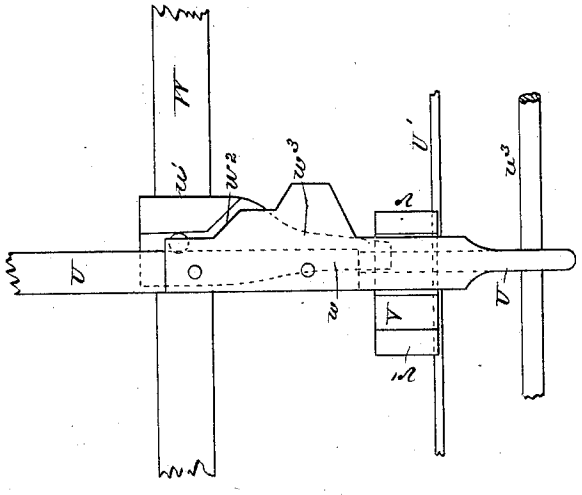
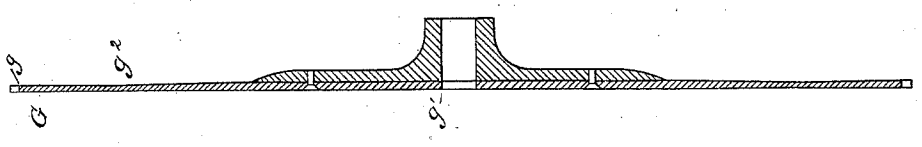


Fig. 10.



WITNESSES

Ed. A. Newman,
Al. C. Newman

INVENTOR

A. Bertsell Ireland,
By his Attorneys
Baldwin, Hopkins & Peyton

UNITED STATES PATENT OFFICE.

A. BERTSELL IRELAND, OF GREENE, NEW YORK.

MACHINE FOR CUTTING SHINGLES.

SPECIFICATION forming part of Letters Patent No. 342,017, dated May 18, 1886.

Application filed April 15, 1885. Serial No. 162,333. (No model.)

To all whom it may concern:

Be it known that I, A. BERTSELL IRELAND, of Greene, Chenango county, New York, have invented certain new and useful Improvements in Machines for Cutting Shingles, of which the following is a specification.

My invention relates to the class of shingle-cutting machines in which a bolt or block of wood is fed to a circular saw, and as soon as a shingle is cut is automatically withdrawn from the saw, advanced laterally, and then again repeatedly fed, advanced, and withdrawn, until the whole bolt is cut into shingles.

My invention consists, mainly, in improved mechanism for operating the bolt-carriage; but also involves certain other improved combinations and organizations, whereby the operation of the machine is made easy, efficient, and reliable.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine; Fig. 2, a plan view; Fig. 3, an end view of part of the machine, showing particularly the bolt-carriage; Fig. 4, a plan, partly in section, of the carriage on the line 4 4 of Fig. 3, certain parts being removed; Fig. 5, a rear view of the lower part of the carriage; Fig. 6, a detail view of the weight-block and one of the gage-arms. Figs. 7 and 8 are views of the mechanism for starting and stopping the machine; Fig. 9, a detail of the clutch-tripping mechanism, and Fig. 10 a cross-section of the saw.

The supporting-frame A may be of any suitable construction. It is provided with uprights B, connected by a cross-beam, C, and with brackets D D, having bearings E, in which the arbor F that carries the saw G is journaled. On the arbor F are mounted the driving-pulley H, pulleys I and J, for transmitting motion to the mechanism for operating the carriage, and a pulley, K, for transmitting motion to the jointer. The jointer L is of the ordinary construction. It is, however, preferably arranged transversely or at right angles to the saw, nearly in line with the saw-arbor, so as to bring it within convenient reach of the operator. The jointer is driven by an endless band, M, leading from the pulley K over the pulleys N N, mounted on a standard, O, of the main frame.

I preferably employ a saw such as illustrated in Fig. 10. It is made of a single piece of metal, and is of uniform thickness from g' to g^2. From the extreme edge of the teeth g to the point g^2 it is dished, concaved, or cut in on both sides, whereby the saw is given a perpetual set, and in operation a clearance as soon as it begins to cut. I do not, however, herein claim the construction of the saw, as this subject-matter is claimed in an application filed by me June 6, 1885.

The bolt-carriage consists of parallel C-shaped uprights P, having upwardly-projecting extensions p, united by a cross-piece. p', that is provided with guide-blocks p^2, that travel on a track, c, carried by the cross-beam C. The lower ends of the uprights P are secured to a beam, P', carrying on its under side rollers p^3, that travel over a track, a, on the main frame and support the weight of the carriage. In the lower ends of the uprights P is journaled a roller, Q, consisting, preferably, of a series of disks, q, with toothed or roughened peripheries mounted on a common shaft, q'. The disks q are independent of each other, and have an independent movement on the shaft; but they fit the shaft so tightly that normally they revolve together, and only move independently when they are subjected to irregular strain, as when one part of the bolt is fed faster than the other. This arrangement prevents slipping and undue strain on the roller. A guard-comb, X', is placed in front of and between the disks to catch the spalt and prevent clogging. A wheel, q^2, is secured to one end of the shaft q', and its periphery is provided with a series of teeth that are so spaced and arranged as when in operation to regulate the movement of the bolt. Preferably the roller q^2 is made up of two toothed disks, one being fast on the shaft q' and the other adjustable on the first by means of a slot and set-screw, as shown in Figs. 3 and 4. This is, however, a common expedient, and I do not claim it.

A roller, Q', similar in construction to Q is journaled in bearings q^3, that are adjustable, as presently described, in slots p^4 of the uprights P. A weight-block, q^4, (preferably of iron,) is attached to the bearings q^3, and tends to hold the roller Q' down upon the bolt. The roller Q' carries a toothed wheel, q^5, simi-

lar to q^2. A vertical rod, q^6, is pivoted loosely to the block q^4 and extends up through the cross-piece p', that is provided with an opening that allows the rod q^6 to have considerable play in all directions. A lever, q^7, (see Fig. 2,) is pivoted loosely in a fulcrum, q^8, and is bent at q^9, and then prolonged a short distance beyond the rod q^6. To the end of the lever q^7 is pivoted a short arm, q^{10}, provided with a mortise, q^{11}, through which the rod q^6 extends, and in which it normally loosely rests. If the outer end of the lever be slightly depressed, the short arm q^{10} will be turned slightly and the rod q^6 grasped by frictional contact with the ends of the mortise q^{11}. If the lever now be further depressed, the block and roller will be elevated to the desired position. By turning the lever q^7 laterally, so that it will rest on its support q^{12}, the block and roller will be held in its elevated position. When the bolt is placed in position and the lever q^7 freed from its support, the short arm q^{10} comes down on the cross-piece p', and the vertical arm q^6 will slip loosely through it, so that the block and roller will descend upon the bolt. By this arrangement the block and roller Q′ will always follow down and rest squarely on the tops of the shingle-bolts, notwithstanding irregularities in their size.

The gage-arms Q^2 Q^3 bear against the front of the bolt and hold it in position. The upper arm, Q^2, (see Figs. 1 and 6,) is provided with an enlarged end, q^{20}, and is bent around so as to present a straight arm, q^{13}, that extends across the front of the carriage. On the outer end of the arm is a roller, q^{14}, that normally bears against the enlarged or widened portion b, Fig. 1, of a vertical rod, b', located near the edge of the saw. The rod b' is attached at its lower end to the table e. The upper end is curved over the bolt-carriage and then extended down to the cross-beam C, to which it is secured. It is preferably provided with laterally-projecting feet b^2, having slots b^3, through which extend bolts b^4, that secure the rod to the table and to the cross-beam. The rod may thus be adjusted transversely toward and from the horizontal plane of the saw. The rod b' also serves as a guard to protect the operator from the saw. A bolt, q^{15}, secures the arm Q^2 to the weight-block q^4, but permits it to have a slight rocking or hinged movement parallel with the bed-plate of the machine. Set-screws q^{16} q^{17}, that work against the weight-block, prevent the block from having a vertical pivotal movement, and a set-screw, q^{18}, limits the horizontal play of the arm. The arm Q^3 is substantially the same in construction and operation as the arm Q^2; but it has preferably a slight vertical adjustment, limited by the slot q^{19}. The roller on the outer end of the lower arm, Q^3, bears against the enlarged or widened portion b^5 of the rod b'.

By adjusting the rod b' and the arms Q^2 Q^3 the bolt may be fed forward so as to be cut into shingles of the desired thickness and bevel. The toothed wheels q^2 q^5 may be easily removed and replaced by wheels having teeth properly spaced to correspond with several adjustments of the bolt and the arms Q^2 and Q^3, and the wheels may be adjusted by changing the relative positions of the two disks, as above explained. When the end of the arm Q^2 passes the rod b', it moves out so as to allow the shingles to fall readily.

A rod, h, Fig. 3, is pivoted to the upright P at h', and is slotted at h^2 and h^3, to receive the pivots h^4 of the pawls h^5 and h^6. Both of the pivots are adjustable, and may be set at any desired position in the slots. The pawl h^5 is arranged to turn the roller Q′ by pulling on the teeth of the wheel q^5. The pawl h^6 turns the roller Q by pushing the teeth of the wheel q^2. The upper end of the rod h is provided with a roller, h^7, that travels in a cam-track, h^8, Fig. 2, formed in plates h^9 and h^{10}, mounted on the cross-beam C and in the connecting-links h^{13}. The grooves in the plates h^9 and h^{10} are about parallel with the line in which the carriage moves. The plate h^{10} is provided with an arm, h^{11}, having a curved slot, h^{12}, through which extends the securing-bolt h^{15}. The plate may thus be adjusted to and from the beam. The plate h^9 is permanently attached to the beam C. The plates h^9 and h^{10} are connected by parallel pivoted links h^{13}, between which the roller h^7 travels. As the plate h^{10} is adjusted out or in, the inclination of the links is made greater or less, and the rod h is correspondingly moved. When the carriage moves forward, the roller h^7 on the end of the rod h travels in the cam-track. When it passes between the links h^{13}, the bar h is turned on its pivot, causing the pawl h^5 to advance and the pawl h^6 to recede, each of which engages with its wheel q^2 or q^5. When the carriage returns, as soon as the end of the rod h passes between the links, the rod is turned so as to cause the pawls to turn the rollers and thus advance the bolt.

By regulating the teeth in the wheels q^2 and q^5, and giving the pawls a proper adjustment in the slots, the bolt may be fed so as to cause the machine to cut shingles either straight or beveled and of the desired thickness. The teeth in the wheels q^2 and q^5 are irregularly spaced, so that shingles are set thick and thin alternately—*i. e.*, the bolt is oscillated so that the lower edge of the shingle is first thick and then thin, and the upper edge vice versa. There is, therefore, no waste in cutting.

A block, d, Figs. 1 and 2, is hinged to the vertical rod b', and is normally held against the side of the saw near its edge by a spring, d'. When the carriage is fed forward, and the bolt comes to the block, the shingle that is being cut from the bolt forces the block d away from the saw and passes by it. As soon as the bolt has passed the edge of the saw, the block springs back and prevents the shingle, now severed from the bolt, from falling back into the carriage-way, but permits it to fall on the operator's table e. The table is located at the

side of the machine between the saw and the jointer. It is supported on brackets e', and is preferably inclined downwardly toward the jointer. By this arrangement the shingles are made to fall in a more convenient position for the operator than where the table is straight. A metal guard, e^2, is secured to the upper side of the table nearly flush with the side of the saw, so as to prevent the shingles from falling between the saw and table.

Two pulleys, R R′, Fig. 2, are loosely mounted on the shaft r, that is journaled in bearings r', mounted on the main frame. The pulley R is preferably provided with three or more peripheries, r^2, of different diameters, to vary the speed of the shaft r. A belt, r^3, connects the pulley R to the pulley I on the saw-arbor F. The pulley R′ is connected with the pulley J on the arbor F by means of a crossed belt, r^4. The shaft r is provided with a pinion, r^5, that meshes with a gear-wheel, S, fast to a shaft, s, that is mounted in suitable bearings, s', in the main frame. On the opposite end of the shaft s is a pinion, s^2, Fig. 4, that gears with a rack, s^3, rigidly secured to the carriage by means of brackets s^4. If the wheel R be made tight on the shaft r and the pulley R′ be loose, when the saw-arbor is revolved the shafts r and s will be in turn revolved, and the carriage will be fed forward. If, now, the wheel R′ be made fast and the wheel R loose on the shaft r, the shafts r and s will be revolved in an opposite direction, thus returning the carriage.

T is a clutch for operatively connecting the pulleys R R′ to the shaft r. It consists of a block, t, that slides on a feather on the shaft r, and pivoted arms or toggles t', that radiate from the block and engage in annular grooves on the inner sides of the pulleys R R′ when the block is fed toward them.

The clutch is automatically operated as follows: A lever, U, pivoted at u, is secured at u' to the clutch-block t, and slides on a rod, u^3, against the force of opposing coiled springs u^4 and $u^\times$. The rod u^3 slides in guides on the main frame. On the inner end of the rod u^3 is a roller, u^5, Fig. 4, that travels in a cam-track, u^6, on the under side of the carriage. As the carriage moves, the rod u^3 is reciprocated, thus alternately forcing the springs u^4 and $u^\times$ against the end of the lever U, so that when free to act they will move the lever U and shift the clutch, and thereby operatively connect the pulleys R R′ alternately with the shaft r. A lever, U′, Fig. 2, is pivoted at u^7 to the main frame, is free to rock vertically, and carries on its other end a roller, u^8, Figs. 1 and 5. The lever moves up and down in a guide, u^9, and is normally held raised by a spring, u^{10}. A wedge-shaped block, u^{11}, Figs. 1 and 5, is secured to the bottom of the carriage. When the wedge u^{11} comes in contact with the roller u^8, it depresses the lever U′. A similar wedge, u^{12}, (dotted lines, Fig. 1,) is carried by a spring-controlled frame, u^{13}, having a guide-rod, u^{18}, Fig. 4, that passes through apertures in the brackets s^4. The frame u^{13} may thus be moved toward and from the carriage. A rod, u^{14}, Fig. 1, is pivoted at u^{15} to the carriage and to the frame u^{13} at u^{16}. The lower end of the rod u^{14} is normally drawn toward the carriage by a spring, u^{17}, and the sliding frame u^{13} tends, therefore, normally to advance by the action of the spring.

U^2 is an adjustable rod or finger carried by the frame u^{13}, that bears against the end of the bolt. It is adjustable in the sliding spring-controlled frame to accommodate bolts of different sizes. By this means the wedge u^{12} may be adjusted toward and from the wedge u^{11}, according to the size of the bolt, so that the tripping-wedge u^{12} may operate as soon as the shingle is severed, whether the bolt be wide or narrow.

u^{19} is a stop secured to the cross-beam C, against which the upper end of the rod u^{14} strikes when the carriage is returned from the saw. When the carriage is at rest in its starting position, the rod u^{14} is held by the stop u^{19} against the force of the spring u^{17}, thus holding the frame and the adjustable bar U^2 away from the bolt; but as soon as the carriage moves forward a little the rod u^{14} moves away from the stop u^{19}, and the frame u^{13} and rod U^2 move rapidly toward the bolt, the end of the rod U^2 remaining against the side of the bolt until the carriage is returned to its starting position, when it is again withdrawn, as above explained. By this arrangement the rod U^2 is held away from the bolt while it is being fed by the rollers Q Q′, and is immediately advanced to the bolt when the feeding is completed. On the lever U′ is a block, V, having side pieces, v v', Fig. 9, and a central lug, v^2. A lug or tooth, v^3, on the under side of the lever U fits in between the sides v v'. When the tooth v^3 is in engagement between the lug v^2 and the side v, the clutch will engage with the pulley R, for sending the carriage forward, (the rod u^3, spring u^4, and inner end of the lever U being then drawn toward the carriage.) When the tooth is between v^2 and v', the pulley R′ will be clutched for returning the carriage. When the carriage is in position to be fed forward, the tooth v^3 is between the lug v^2 and the side v of the block V. In this position the spring $u^\times$ on the rod u^3 bears against the end of the lever U and tends to move it over between v' and v^2, but cannot do so until the lever U′ is depressed. The spring u^4 acts similarly in the opposite direction. As the carriage advances, the rod u^3 and springs u^4 and $u^\times$ are shifted by means of the cam-track u^6 on the bottom of the carriage acting on the roller u^5 on the end of the rod u^3; but the clutch cannot be changed until the lever U′ is disengaged from the lever U. This is effected when the carriage has reached the limit of its travel forward by means of the wedge u^{12}, that depresses the lever U′, thus allowing the tooth v^3 to jump over the lug v^2 by the force of the spring $u^\times$ and (the lever U′ being now raised by the spring u^{10}) to engage

with the block V, between the side v' and the lug v^2, thus holding the lever U while the carriage is being returned. Just before it reaches the terminus of its travel backward the lever U′ is depressed by the wedge w^{11}, thus shifting the clutch again and causing the carriage to advance. This operation is repeated until the bolt is cut into shingles.

W is a lever for starting and stopping the movement of the carriage, Figs. 7 and 8. It is provided with a wedge-shaped block, w, Fig. 7, that passes between the block V and lever U when the lever W is actuated, and forces down the lever U′ so as to disengage its block V from the lever U. It also has a wedge, w', that works against an incline, w^2, on a block, w^3, on the lever U, so as to push the lever U into its central position to loose both pulleys R R′.

In brief, the operation of the machine is as follows: The bolt having been placed in position in the carriage the lever W is turned so as to clutch the pulley R to advance the carriage, through the medium of the shaft r, pinion r^5, wheel S, shaft s, pinion s^2, and rack s^3. While the carriage is traveling forward the rod w^3 is shifted by the cam-track w^6, and just before the carriage reaches the limit of its travel forward the lever U′ is depressed by the wedge w^{12}, thus allowing the clutch-operating lever U to be shifted by means of the spring $u^\times$. The receding pulley R′ being thus clutched the carriage will be returned, and while returning the rod w^3 will be shifted back so as to bring the spring w^4 against the end of the lever U. When the carriage has nearly reached the limit of its travel back, the upper end of the rod w^{14} comes into contact with the stop w^{19}, thus withdrawing the finger U^2 from the bolt. When this is effected, the roller h^7 on the end of the rod h travels between the inclined links h^{13}, thus operating the pawls or dogs h^5 and h^6 to turn the roller Q and Q′, to advance the bolt transversely in the carriage. As the carriage recedes still further, the lever U′ is tripped by the wedge w^{11}, thus allowing the lever U to be shifted by the spring $u^\times$, so as to clutch the pulley R for advancing the carriage. The carriage is thus automatically repeatedly advanced and returned, and the bolt is automatically fed transversely in the carriage, so that an entire bolt may be cut into shingles without any attention from the operator. The shingles are taken from the table and finished by the jointer in the usual way.

I claim as my invention—

1. The combination, substantially as set forth, of the main frame, the saw, the driving shaft or arbor, the pulleys R R′, gearing between the pulley R and the driving-shaft, a reverse-gearing between the driving-shaft and the pulley R′, the shaft on which the pulleys R R′ are loosely mounted, the reciprocating bolt-carriage, gearing between the driving-shaft and the carriage, and the clutch mechanism automatically operated by the carriage to alternately operatively connect the pulleys R R′ with the shaft.

2. In a shingle-cutting machine, the combination, substantially as set forth, of the saw, the jointer arranged at right angles to the saw behind its cutting-edge, the inclined table arranged in the angle between the saw and the jointer, and means, substantially such as described, for driving the jointer from the saw-arbor.

3. In a shingle-cutting machine, the combination, substantially as set forth, of the frame, the saw, and the spring-block hinged to the frame near the cutting-edge of the saw, which permits the forward movement of the shingles as they are being cut from the bolt and prevents the shingles from falling back into the carriage-way.

4. In a shingle-cutting machine, a bolt-carriage having a frame, a series of feed-disks mounted on a common supporting-rod carried by the frame, said disks being arranged to normally turn together, but having an independent movement when subjected to irregular strain, in combination with the main frame of the machine, the saw, mechanism for driving the saw and reciprocating the carriage, and devices for turning the feed-disks.

5. In a bolt-carriage, the combination, substantially as set forth, of the frame, a feed-roll, a vertical rod connected therewith, a lever pivoted to the frame, and a gripping device on said lever with relation to which the rod is free to slide downward, but which clutches the rod at any point which may be presented to the gripping device and elevates the roll when the gripping end of the lever is raised.

6. In a bolt-carriage, the combination, substantially as set forth, of the weight-block, the vertical rod attached thereto, the lever pivoted to the frame of the carriage, and the short arm pivoted to the end of the lever and provided with a mortise through which the rod loosely extends, for the purpose specified.

7. In a bolt-carriage, the combination, substantially as set forth, of the uprights, the feed-rolls journaled in the uprights, and the arm that is secured to the carriage and bears against the front of the bolt and holds it in place.

8. In a bolt-carriage, the combination, substantially as set forth, of the uprights, the feed-rolls journaled in the uprights, the hinged arm that is secured to the carriage and bears against the front of the bolt and holds it in place, and devices for adjusting the arm.

9. In a bolt-carriage, the combination, substantially as set forth, of the uprights, the feed-rolls journaled in the uprights, the hinged arm that is secured to the carriage and bears against the front of the bolt, the roller on the outer end of the arm, and the vertical rod secured to the main frame of the machine, against which the roller bears.

10. The combination, substantially as set

forth, of the main frame, the bolt-carriage, the rollers journaled in the carriage, the toothed wheels on the rolls, the rod pivoted on the carriage, the adjustable pawls carried by the rod, and the adjustable cam-track on the main frame of the machine, in which the upper end of the pawl-carrying rod travels.

11. The combination, substantially as set forth, of the main frame, the driving-pulleys, the carriage, gearing between the driving-pulleys and the carriage, the clutch mechanism operated by the movement of the carriage to cause the carriage to alternately advance and recede, and the adjustable automatic clutch-tripping mechanism for regulating the forward movement of the carriage and for automatically shifting the clutch mechanism to return the carriage.

12. The combination of the main frame, the bolt-carriage, the endwise-moving frame u^{13}, mounted on the bolt-carriage, the arm carried thereby, which bears on the end of the bolt while it is being advanced and retracted, the lever-arm u^{14}, which draws the frame u^{13} away from the bolt before the bolt is fed forward in its carriage, mechanism for feeding the bolt, the tripping device or wedge u^{12} on said frame, and the driving-gear and reversing and tripping devices, substantially as set forth.

13. The combination, substantially as set forth, of the main frame, the carriage, the driving-pulleys, gearing between the pulleys and the carriage, the clutch for operatively connecting the gearing with the pulleys, the lever secured to the clutch, the transverse rod to which the lever is connected, the springs on said transverse rod arranged on opposite sides of the lever, the cam-track on the carriage, in which the inner end of the transverse rod works, and the rod U′, that engages and holds said lever, and devices carried by the bolt-carriage which operate the lever U′ and at intervals release the lever and permit it to be shifted by said springs.

14. In a shingle-cutting machine, the combination, substantially as set forth, of the main frame, the saw-arbor, the saw, the carriage, the driving-pulleys on the saw-arbor, the clutches, gearing between the driving-pulleys and the clutches, gearing between the clutches and the carriage, the clutch-shifting devices operated by the movement of the carriage, and the hand-lever W, that is pivoted to the main frame and that engages with the clutch-shifting mechanism, whereby the operator may connect or disconnect the gearing between the carriage and the saw-arbor.

In testimony whereof I have hereunto subscribed my name.

A. B. IRELAND.

Witnesses:
J. E. JULIAND,
W. J. RUSSELL.