3 Sheets—Sheet 1.

D. LANE.

Shingle Sawing Machine.

No. 237,294. **Patented Feb. 1, 1881.**

Fig. 1.

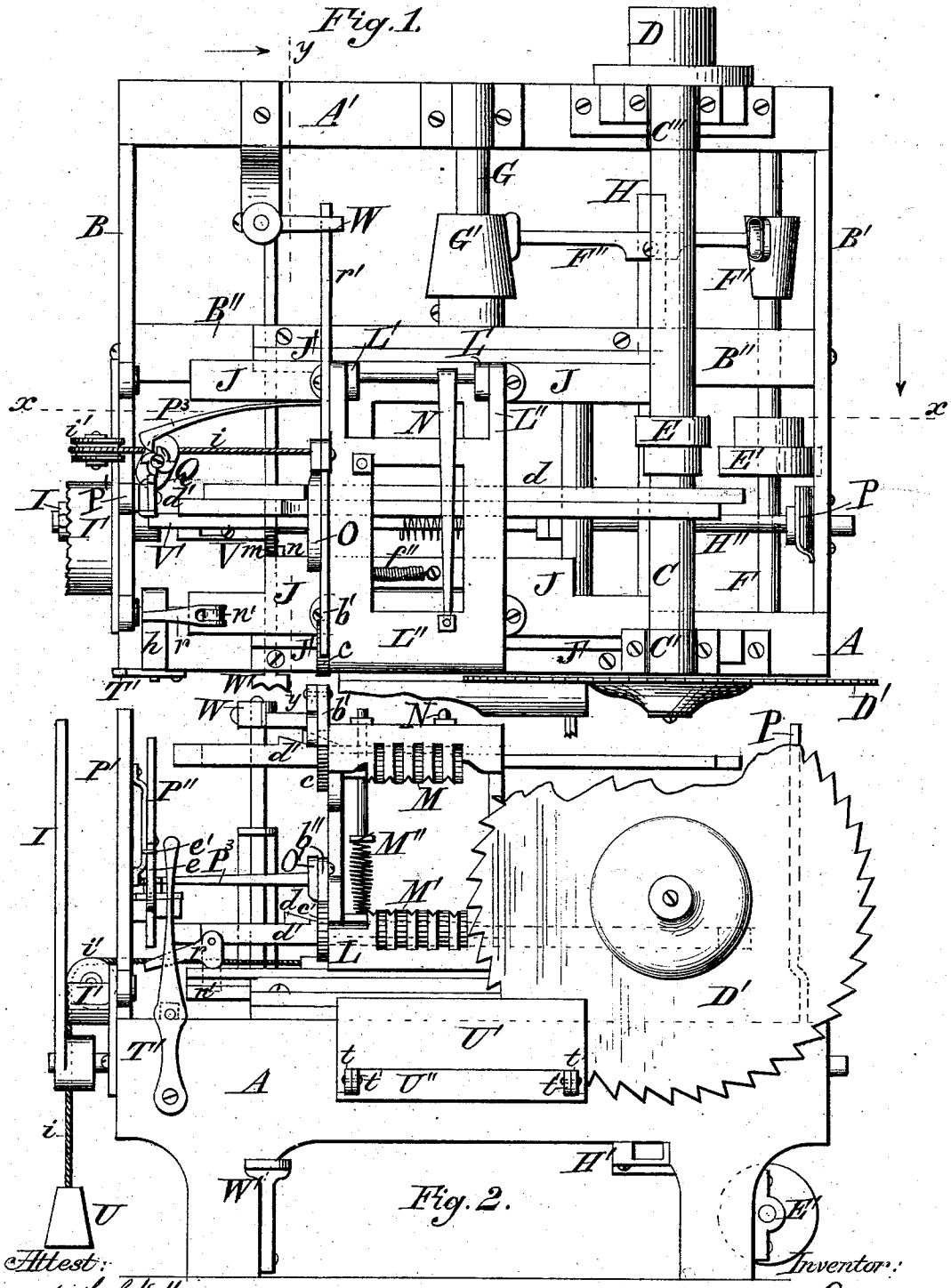

Fig. 2.

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F. H. Schott.
Jerd. Schmidt

Inventor:
Dennis Lane
per J. C. Tasker atty

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Fig. 3.

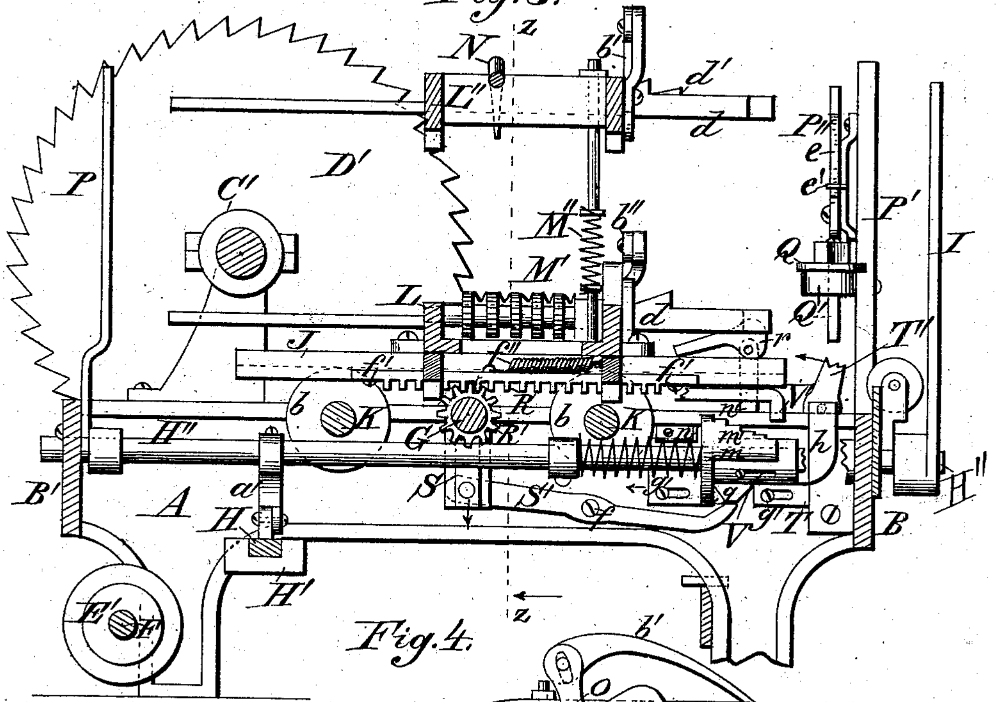
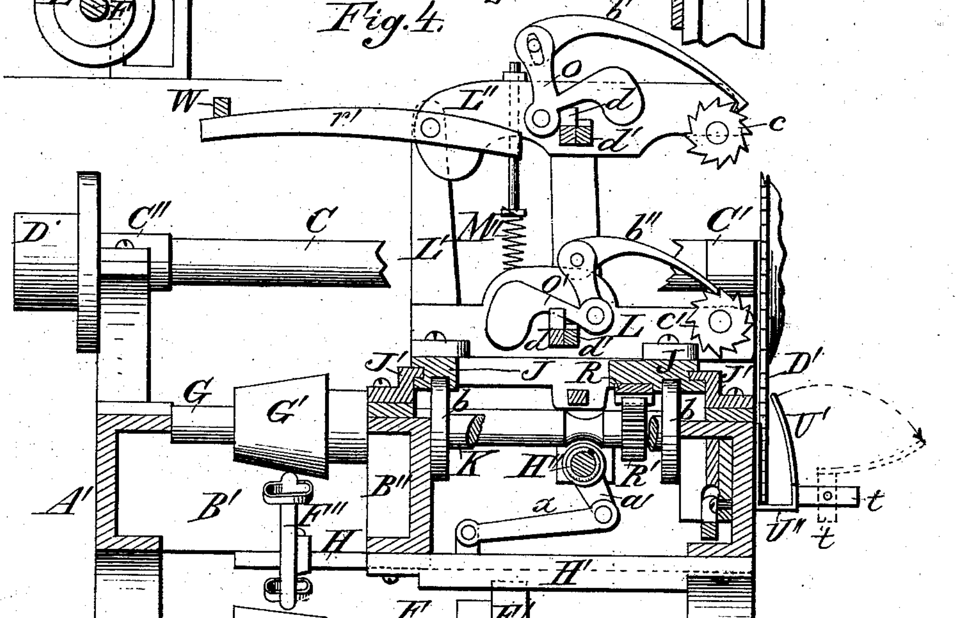


Fig. 4.



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D. LANE.

Shingle Sawing Machine.

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Fig. 5.

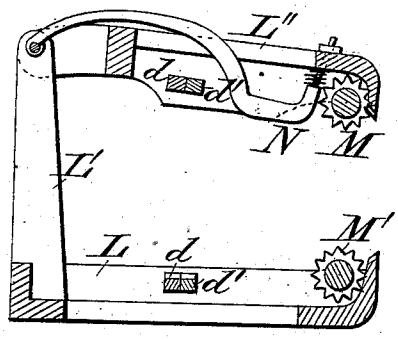


Fig. 6.

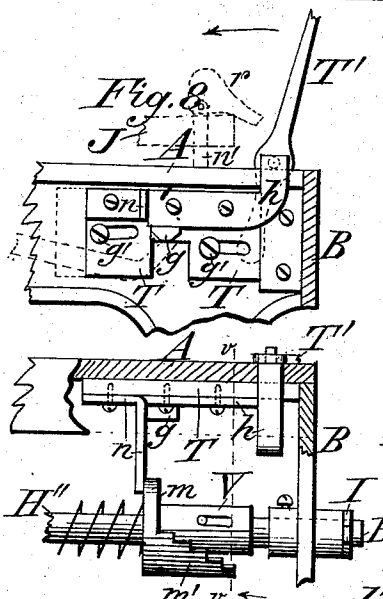


Fig. 8.

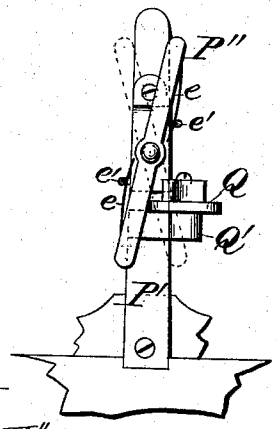


Fig. 9.

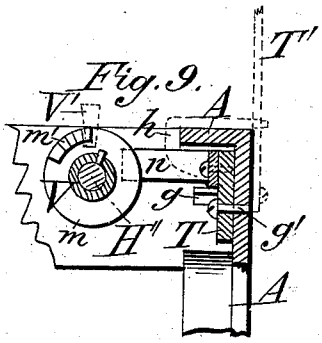
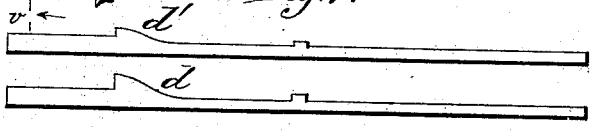


Fig. 7.



Attest:

F. H. Schott

Jerd. Schmidt

Inventor:

Dennis Lane

per J. C. Fraser Atty

UNITED STATES PATENT OFFICE.

DENNIS LANE, OF MONTPELIER, VERMONT, ASSIGNOR TO THE LANE MANUFACTURING COMPANY, OF SAME PLACE.

SHINGLE-SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 237,294, dated February 1, 1881.

Application filed January 7, 1880.

To all whom it may concern:

Be it known that I, DENNIS LANE, a citizen of the United States, residing at Montpelier, in the county of Washington and State of Vermont, have invented certain new and useful Improvements in Shingle-Sawing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of machines used in the production of shingles by sawing them from blocks of wood, or "bolts," as they are technically called, said bolts being presented sidewise to the saw, so that the cut of its teeth shall be lengthwise of the bolt or nearly parallel with the fiber of the wood, experience having demonstrated that shingles so cut are much superior in point of durability to those formed by sawing across the fiber or grain of the wood, and the object of the present invention is to improve the devices used for holding and guiding the bolt; also those employed for the purpose of moving the bolt forward after the cutting of each shingle from it in such a manner that points and butts shall be cut alternately from each end of the bolt, thus keeping the latter in such position as to insure a cut of the saw-teeth in the direction of the fiber of the wood and not diagonally across it, as would be the case were the points all cut from one end of the bolt and the butts from the other; and the invention consists in the construction and arrangement of devices for accomplishing the above-named results in the manner hereinafter described, and specifically stated in the claims.

In the drawings, Figure 1 is a plan of the machine complete, showing a general arrangement of the parts. Fig. 2 is a side view of the same, showing the relative positions of the saw and bolt-carriage. Fig. 3 is a longitudinal section on the line *x x* of Fig. 1. Fig. 4 is a transverse vertical section on the line *y y*, Fig. 1. Fig. 5 is a vertical section through the carriage, showing the knife-guide, which compels the bolt to move forward in a straight line. Fig. 6 is an enlarged end view of the shifting apparatus. Fig. 7 shows the sliding cam-bars, by means of which the forward movement of the bolt is produced; and Figs. 8 and 9 are details.

The frame of this machine is similar to those now in use for a like purpose, consisting, essentially, of the two metallic side pieces, A and A′, provided with legs and connected at the ends by suitable end pieces or girts, B and B′, which support the longitudinal girt B″, that passes lengthwise of the machine nearly through its middle. Upon this frame are carried the operative parts of the machine, which consist of the saw-arbor C, revolving in the journal-boxes C′ and C″, the pedestals of which are firmly bolted to the top of the side pieces, A and A′, of the frame. A rotary motion is given to this arbor by a belt from any suitable motor running upon the pulley D, placed outside the journal-box C″ upon the extreme end of the arbor, while its opposite end carries the saw D′, outside of the journal-box C′. Between these two journal-boxes is secured the cone-pulley E, a belt from which, running upon the corresponding pulley E′ upon the intermediate shaft F, operates the feed-shaft G through the intervention of a belt running upon the cone-pulleys F′ and G′, secured, respectively, upon the feed and intermediate shafts. This belt, in its passage from one cone-pulley to the other, passes through the loops in the opposite ends of the belt-shifter F″, that is adjustably secured upon the bar H, sliding transversely in the ways H′, secured to the under side of the side piece, A, and girt B″.

Upon the upper side of the bar is a stud to which is pivoted one end of the connection *a*, its opposite end being pivoted to the arm *a′* upon the rock-shaft H″, extending longitudinally the whole length of the machine and projecting through the end piece, B, where it receives the hand-lever I, said hand-lever being provided with a knife-edge that catches in notches formed in the segment I′, so that by moving the hand-lever the position of the belt upon the cone-pulleys is changed, thereby varying the speed of the feed-shaft, and

with it that of the bolt-carriage as it moves toward the saw. This bolt-carriage is formed by a bed, J, preferably in one piece of metal, and having longitudinal grooves in its sides in which fit tongues formed upon the ways J′, that are securely bolted to the side piece, A, and girt B″ of the machine-frame. It will thus be seen that the longitudinal movements of the carriage are accurately guided; but to relieve the ways from the greater part of the weight of the carriage, thereby preventing wear, and at the same time relieving the parts of undue friction, the wheels *b b*, secured upon axles K, that revolve in suitable bearings in the side piece, A, and girt B″, have their peripheries running in grooves formed in the under side of the bed J, so that they not only bear up the carriage, but to a certain extent assist in preventing its lateral movement.

Upon the reciprocating-bed is secured the frame L, which is of rectangular shape, and provided at one side with the standards L′, to the top of which is pivoted the swinging frame L″. The free end of this frame carries the serrated setting-roll M, the journals of which revolve in suitable bearings in the frame, one of them projecting through the frame and carrying upon its overhanging end the ratchet-wheel *c*, the teeth of which are evenly spaced, so that a certain specified movement of the pawl *b′* shall always give an equal rotation to the roll M. The lower part of the frame L is also provided with a similarly serrated roll, M′, that is rotated by means of the pawl *b″* acting upon the ratchet *c′* secured upon the end of one of its journals. These setting-rolls give motion to the shingle-bolt, which is placed between them, the serrations on the periphery of the rolls biting into the ends of the bolt and moving the latter forward the distance necessary to give the thickness of a shingle at each reciprocation of the carriage; and in case the weight of the swinging frame should not be sufficient to enable the setting-rolls to obtain the necessary hold upon the shingle-bolt a spring, M″, is placed between the frame L″ and bed J, which draws the swinging frame forcibly downward, causing the serrated rolls to take a firm hold upon both ends of the bolt.

Heretofore difficulty has been experienced from the fact that the bolts are not always of even length, so that the rolls bite harder at one end than the other, thus canting it and causing the shingles to be thicker on one edge than the other. In order to prevent this canting I secure to the frame L″ a knife, N, the edge of which cuts into the top of the bolt and effectually prevents all lateral motion which would tend to cant it to either side, thus causing the bolt to move forward in a straight line, so that the shingles cut from it shall be of equal thickness at both edges. It will be evident that this knife N may, if desired, be placed in the lower part or frame L of the carriage, so as to act upon the lower end of the bolt with precisely the same result.

In order to produce a proper rotation of the setting-rolls, so as to cut the shingles of a proper form—that is, thick at one end and thin at the other—the teeth of the ratchet-wheels are so spaced that a movement the distance of one tooth will give the proper thickness for the point, while three teeth give that required for the butt. The number of teeth in these ratchets may evidently be doubled, if desired, so long as the proper ratio between their movements is maintained in operating them, and the throw or movement of the pawls by which they are operated may be increased or diminished by slotting the ends of the rocking arms to which they are attached, so that the point of attachment may be placed farther from or nearer to the pivot upon which the rocking arm oscillates. To produce the movement the sliding cam-bars *d d′* are placed in suitable mortises, which allow them an easy longitudinal movement in both the bed L and swinging frame L″. An incline or cam is formed upon each of these bars, those upon the bars *d* being of sufficient height to move the weighted portion of the rocking arms O and O′ the necessary distance to cause a sufficient rotation, through their actuating-pawls, of either of the feed-rolls M or M′, to set the bolt forward the distance needed to form the butt of the shingle, while the elevation of the incline or cam upon the bars *d′* is only sufficient to give the movement necessary to form the point. In order to give the proper movement to these sliding bars *d d′*, two vertical posts, P and P′, are secured to opposite ends of the frame, and are of such height and width that when the carriage moves forward in cutting a shingle from the bolt the ends of bars *d d′* shall strike the post P, causing said bars to slide backward in the mortises in the carriage, so that the rocking arms O O′ no longer rest upon the cams, but fall down, carrying the pawls *b′ b″* with them into the proper position to move the feed-wheels forward at the next reciprocation of the cam-bars, which is produced as the carriage gigs back after cutting a shingle from the bolt by the ends of said bars striking the shifting-bar P″, which is pivoted near the middle of its length to the post P′. This shifting-bar is not struck simultaneously by all the sliding cam-bars, but alternately by *d* of the lower pair and *d′* of the upper pair, the position of the shifting-bar being then changed, so that at the next reciprocation of the carriage it is struck by the other two cam-bars. The object of this is to so feed the bolt forward that a butt and point of a shingle shall be alternately cut from the same end of the bolt. By this means the saw is made to cut lengthwise of the fiber of the wood and not across it, the same relation of movement being kept up until the bolt is cut into shingles, all of which will present the side and not the ends of the fiber upon their opposite faces. In order to produce this movement of the shifting-bar P″ the ratchet-cam Q is pivoted upon a stud projecting upward from the bracket Q′, which is attached

to the post P′. This ratchet-cam acts upon the shifting-bar, which is kept in close contact with it by means of the springs *e e*, one end of these springs being secured to the shifting-bar, and their opposite ends bearing against the pins *e′* attached to the post P′.

In order to give the proper movement to the ratchet-cam a spring-pawl, P^3, is attached to the carriage in such a manner that as the carriage moves back in gigging, the hook upon the end of the pawl passes the ratchet; but when the motion of the carriage is reversed, and it moves toward the saw, the pawl catches the teeth of the ratchet and forces the cam against the shifting-lever, so as to place the latter in the proper position for the next reciprocation of the carriage. It will be observed that the cam portion of this ratchet has the form of an elongated parallelogram with the corners rounded, and that the ratchet has but four teeth, one for each side of the cam. Therefore as the latter rotates a side and then an end is alternately presented as a support to the shifting-bar, thus causing the latter to act upon the broad and narrow cam-bars of the carriage, so as to cut a butt and point, alternately, from the same end of the shingle-bolt.

In order to give a proper reciprocating movement to the bolt-carriage a toothed rack, R, is secured to the under side of the bed J by means of the bolts *f′*, passing through slots in the rack and into the bed. A coiled spring, *f″*, having one of its ends secured to the rack and the other to the bed J, allows a slight longitudinal movement of the rack with relation to the bed, and prevents the breaking of teeth from the rack or feed-pinion when they are thrown into engagement with each other.

The feed-pinion R′ is secured upon feed-shaft G and engages with the rack R when the carriage is to be moved toward the saw, as will be hereinafter explained. This engagement of the pinion with the rack is effected by carrying one end of the feed-shaft in the vertically-adjustable journal-box S, which slides up and down in ways secured to the side piece, A, of the frame. This journal-box S rests upon one end of the lever S′, pivoted at *f* to the side frame, A. The opposite end of this lever from that which supports the journal-box is slightly curved upward, and is acted upon by the cam *g* on the cam-plate T, sliding on pins *g′* attached to the frame A and passing through slots in the side of the cam-plate. A bent arm, *h*, is also attached to the cam-plate T and passes over the side of the frame A, where it is attached, by a pivotal connection, to the hand-lever T′, thus forming a means of operating the cam-plate T by hand, as it is evident that when the upper end of this hand-lever is moved toward the saw it will carry the cam-plate T and cam *g* in the same direction, causing the cam to depress the curved end of lever S′ and elevate its opposite end, which carries the journal-box S, thus forcing up the end of the feed-shaft, so that the pinion R′ shall engage with the rack R and carry the bolt-carriage toward the saw, while a movement of the hand-lever in the opposite direction drops the feed-pinion out of engagement with the rack and allows the weight U, through the agency of the rope *i*, passing over the pulley *i′* attached to the end piece, B, of the frame, to draw the carriage back from the saw.

The apparatus as hereinbefore described would form an operative machine, but the movements of the carriage would have to be governed wholly by the hand of the operator. Therefore to make the machine a commercial success in the present state of the art, some means had to be devised by which these movements should be made automatic. This I accomplish by placing upon the shaft H″ a sliding graduated stop, V, which is provided with a flange, *m*, at one end and the graduated segment *m′* attached to said flange. As the carriage is moved forward by the feed-pinion, the hook V′ attached thereto catches on one of the steps of the graduated segment *m′* and carries the stop V along until the flange *m* strikes the arm *n*, projecting from the cam-plate T. This moves the cam-plate, and allows the feed-pinion to drop out of gear with the rack, when the weight U, which has been raised by the forward movement of the carriage, draws the latter back until the adjustable stop *n′* strikes the bent bar *h* and again throws the feed-pinion into engagement with the rack. As it is unnecessary that the carriage should travel the same distance with a narrow bolt that it does with a wide one, it becomes necessary to provide means for limiting the extent of its movement. This is effected by means of the graduated segment *m′* upon the sliding-stop V. It will be seen that as the hand-lever I upon the shaft H″ is turned the shaft and stop V rotate with it, bringing one of the steps of the graduated segment into line with the hook V′, and as this step is at a greater or less distance from the flange *m*, so is the movement of the carriage increased or diminished, and the same movement of the lever I that adjusts the graduated segment also shifts the belt upon the cone-pulleys, so as to increase or diminish the feed in proportion to the amount of work to be done by the saw. A spiral spring is placed upon the shaft H″ in such a position with relation to the flange *m* of the segment as to act upon the flange, and through its momentary connection with the carriage assist in starting back the latter when its motion is reversed. The stop *n′* is provided with a cam-lever, *r*, by means of which it is raised so as to pass over the bent bar *h* when it is desired that the carriage shall come back far enough to allow of the replacement of the slab left between the feed-rolls by a fresh bolt. This movement of the carriage also brings the arm *r′*, attached to the swinging frame L″, under the lifter W, which is connected, by a rod, with the foot-lever W′, so that by placing his foot upon the foot-lever the operator is able to raise the swinging frame and upper setting-

roll, and have both hands at liberty to guide the fresh bolt to its proper position in the machine. The box which receives the shingles is placed at the side of the machine, and in order to prevent the shingles from becoming entangled with or falling against the saw a swinging guard, U′, is pivoted, by the arms *t*, to the arms *t′* of the trough U″, which is attached to side A of the frame, and serves as a conductor for the sawdust and other matters that fall from the bolt as it is being cut into shingles. The pivoting of this guard in the manner described allows it to be turned back when it is desired to remove the saw from the arbor, and also admits of its swinging away to give passage to slivers, and prevent them from wedging between it and the saw.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States the following:

1. In a shingle-machine, the combination of an oscillating shifting-bar, the ratchet-cam by which it is moved, and the spring-pawl attached to the bolt-carriage, with the sliding cam-bars as a means for setting forward the shingle-bolt in a manner to produce alternately the butt and point of a shingle from each end of the bolt, substantially as specified.

2. The combination, in a shingle-machine, of the pivoted and outwardly-swinging guard-plate with the dust-trough and saw, so arranged that the guard-plate may be turned back to allow the removal of the saw, substantially as set forth.

3. In a shingle-machine, a bolt-carriage provided with the adjustable stop *n′*, in combination with the bar *h*, cam-plate T, having arm *n*, the graduated stop V, and a hook, V′, attached to the carriage for lifting or lowering the pinion R′ by means of the intermediate mechanism, substantially as shown and described.

4. In a shingle-machine, the combination, with a bolt-carriage, of the guiding-knife N, arranged to rest upon the end of the bolt at right angles to the feeding-rolls and preserve its rectilinear advance to the saw, substantially as set forth.

5. In a shingle-machine, the combination of the bolt-carriage and its setting-rolls with the double sets of sliding cam-bars *d d′*, weighted pawl-actuating levers O O′, pawls *b′ b″*, ratchets *c c′*, shifting-arm P″, and upright P, arranged to give motion to said rolls in setting the shingle-bolt forward after each successive shingle has been removed by the saw, substantially as specified.

6. In a shingle-machine, the combination of the lever I, shaft H″, graduated stop V, hook V′, pinion R′, arm *a′*, connection *a*, bar *h*, and looped belt-shifter F″, whereby the feed is decreased or increased in proportion to the amount of work to be performed by the saw, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DENNIS LANE.

Witnesses:

JAMES W. BROCK,

CARROLL P. PITKIN.