

P. O'CONNOR.
 COMBINED SHINGLE SAWING AND JOINTING MACHINE.
 APPLICATION FILED JUNE 29, 1910.

1,013,431.

Patented Jan. 2, 1912.

4 SHEETS—SHEET 1.

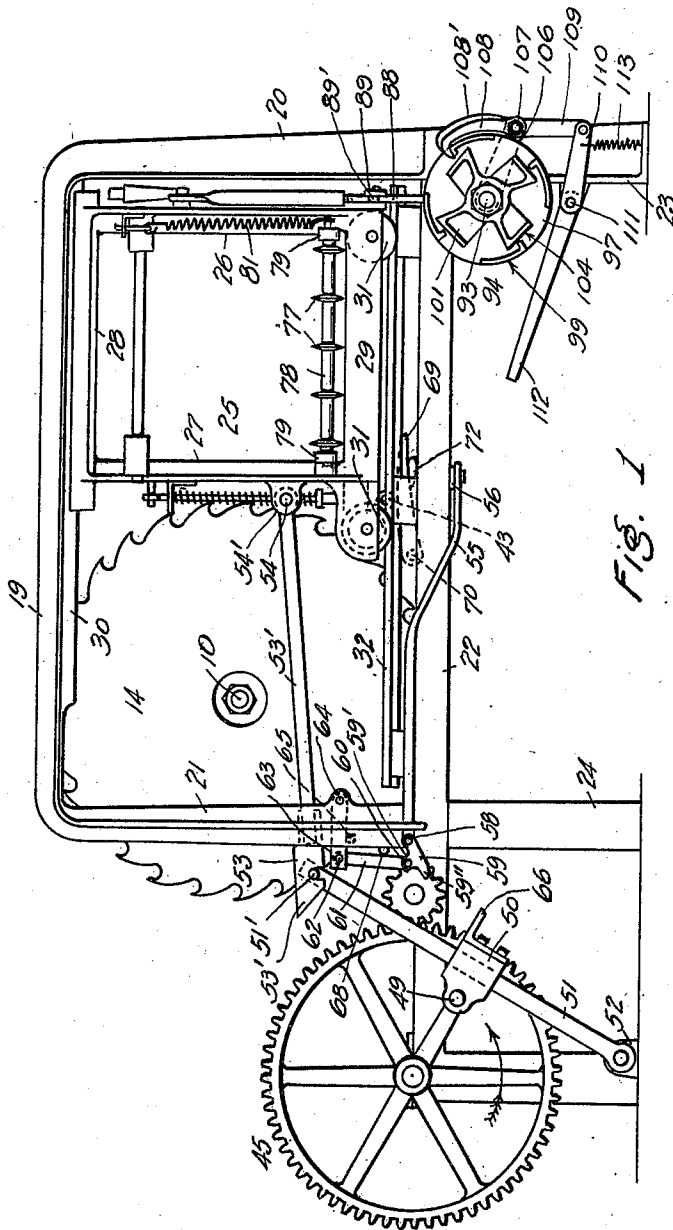


Fig. 1

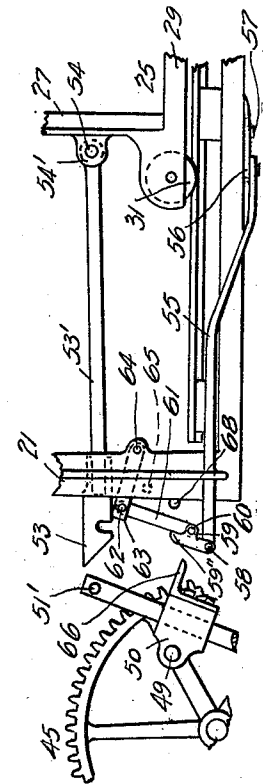


Fig. 4

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INVENTOR:

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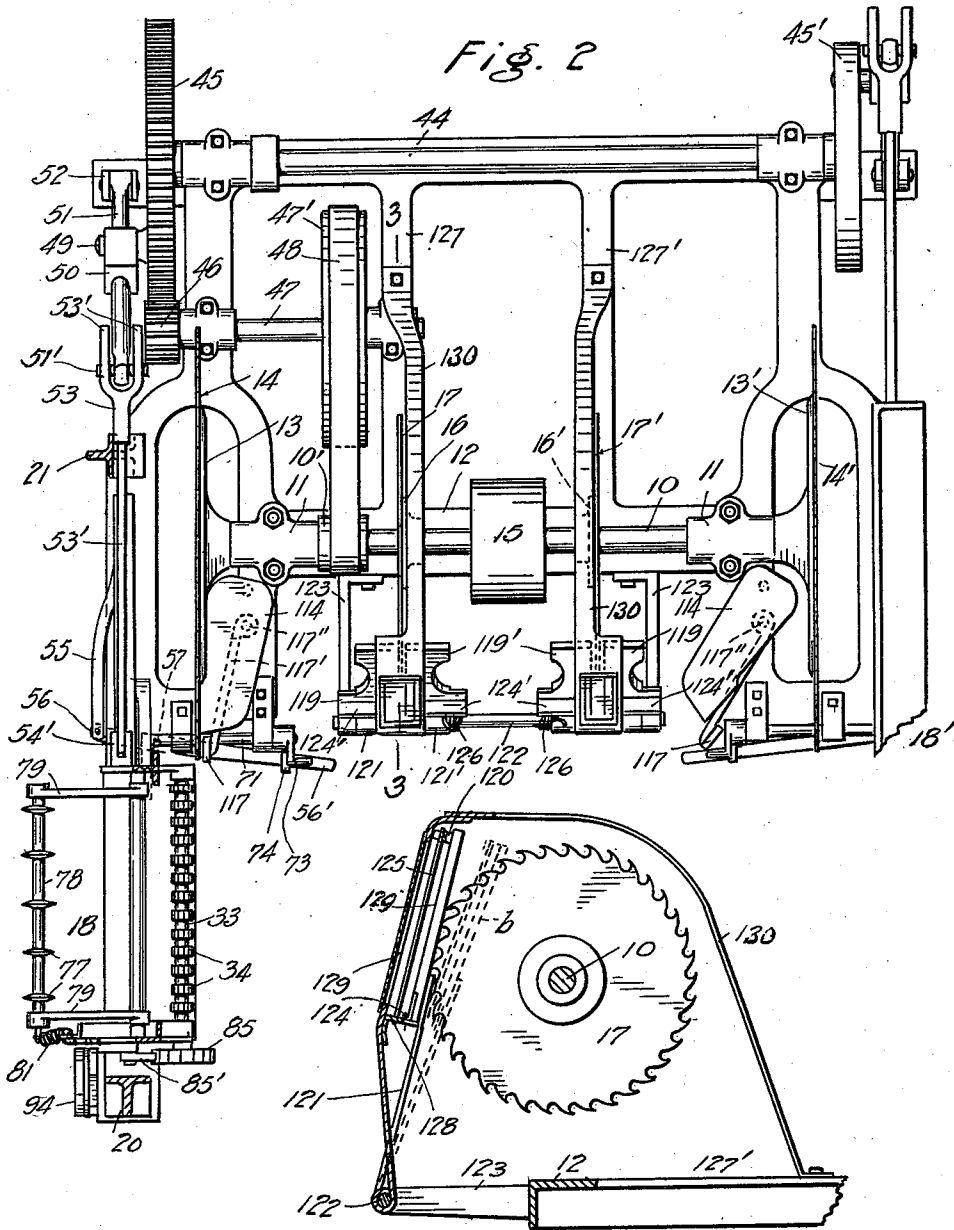
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Fig. 3
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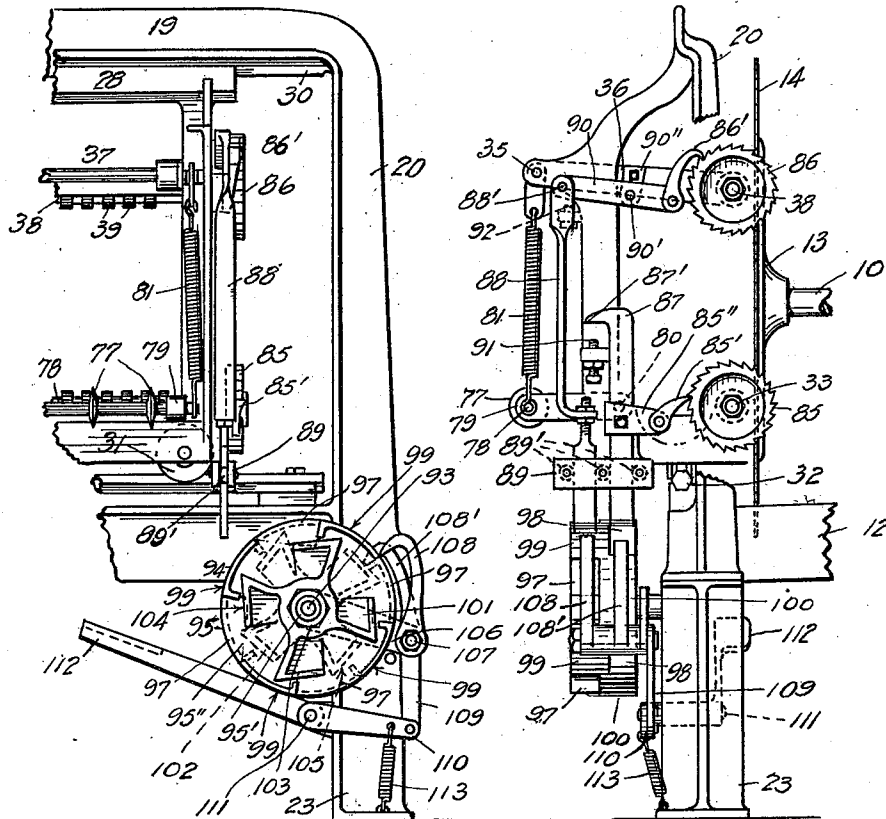


Fig. 5

Fig. 6

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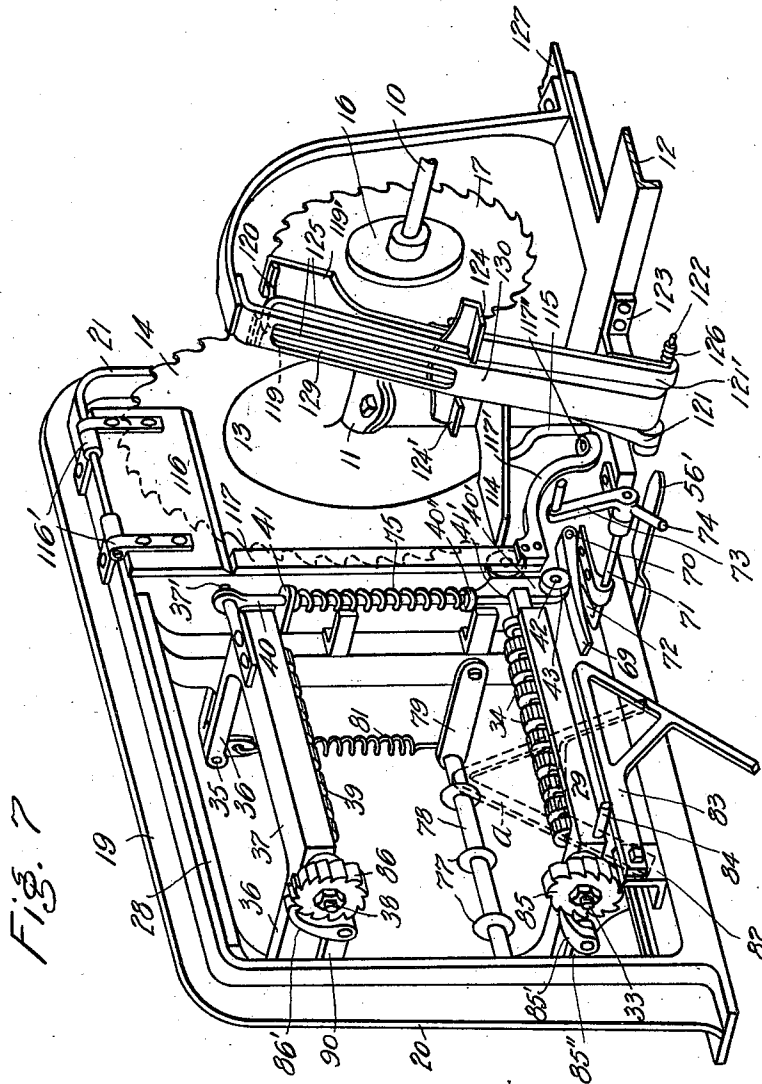
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4 SHEETS—SHEET 4.



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COMBINED SHINGLE SAWING AND JOINTING MACHINE.

1,013,431.

Specification of Letters Patent.

Patented Jan. 2, 1912.

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To all whom it may concern:

Be it known that I, PATRICK O'CONNOR, a citizen of the United States, residing at Aberdeen, in the county of Chehalis and State of Washington, have invented certain new and useful Improvements in Combined Shingle Sawing and Jointing Machines, of which the following is a specification.

This invention relates to that type of shingle-machines known as "uprights" embracing a shingle-cutting saw and a jointing-saw for clipping shingle-edges subsequent to the cutting of the shingles by the aforementioned saw from the shingle-block. Both of these operations are accomplished by a single operator.

The object of this invention, generally stated, is to improve the efficiency of a machine of this class whereby the operations thereof are facilitated and the operator protected from becoming cut by the saws.

A further object of the invention is to so arrange and combine the various parts of the machine that a single arbor may serve for two shingle-cutting saws and two shingle-jointing saws, whereby floor space is economized without interfering with the movements of the operators.

With these ends in view, the invention consists in the novel construction and combination of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a shingle-sawing and jointing machine embodying my invention. Fig. 2 is a plan view of the same with parts broken away. Fig. 3 is a sectional view taken substantially through 3—3 of Fig. 2. Fig. 4 is a fragmentary side elevation showing parts of the machine in a different position from which they are represented in Fig. 1. Figs. 5 and 6, respectively, are side and end elevations of the set works as applied to a block-carriage and the machine-frame. Fig. 7 is a perspective view to illustrate various features of the invention.

The reference numeral 10 designates a saw-arbor journaled in suitable bearings, such as 11, provided in standards formed upon the transverse member 12 of a suitable frame. As illustrated, said arbor carries at its ends removable collars 13 and 13' to

which are secured the shingle-cutting saws 14 and 14'.

Secured to the arbor at about its mid-length is a belt-pulley 15 whereby the arbor is driven. Intermediate said pulley and the ends of the arbor are saw-collars 16 and 16' to which shingle-jointing saws 17 and 17' are detachably secured. These jointing saws, it may be mentioned, are secured to the flanges of the collars upon the sides of the latter which are adjacent to the respective ends of the arbor and the saw eyes are of sufficient diameters to permit the saws being readily removed from the arbor.

In order to remove the jointing-saws, the saw-collars 13 and 13' have to be first withdrawn with the saws 14 and 14' from the arbor and the arbor then raised from its bearings. Extending at approximately right angles from the ends of the frame member 12 are the left and right hand frame-parts 18 and 18', as indicated in Fig. 2. As each of these frames and the associated mechanisms are counterparts, for clearness I will now describe these upon the one side only.

The referred to frame part, 18, for example, is composed of a longitudinally disposed upper element 19 which is supported at its ends by uprights 20 and 21 from a longitudinal base element 22 which, in turn, is supported on posts, or legs, 23 and 24 from the floor. Intermediate said horizontal elements is positioned a shingle-block carriage formed with end-bars 26 and 27 and top and bottom members 28 and 29 extending between said end-bars and which may be advantageously cast integrally therewith. The top member 28 of the carriage is provided with a longitudinal groove to accommodate a track-rail 30 depending from the frame element, 19. The carriage also is provided underneath with peripherally grooved wheels 31 which run upon a subjacent track-rail supported by the frame element 22. Mounted for rotation in said end members of the carriage and in proximity to the member 29 is a longitudinal shaft 33 having mounted thereon a plurality of spaced spur-rolls 34.

Pivottally connected to the carriage parts 26 and 27 by pins 35 are the arms 36 of a swinging jaw 37 and in the latter is a longi-

tudinal shaft 38 which is provided with spaced spur-rolls 39. Projecting from the extremity of the jaw 37 is a stud 37' to receive the eye of a vertically disposed rod 40 extending through guide-lugs 41 and 41' provided on the carriage and terminating below in a block 40' carrying a stud 42 which serves as the axle for a wheel 43 whose office will be hereinafter explained.

Interposed between the lug 41 and a fixed collar 40'' upon said rod is a coil spring 75 which acts to yieldingly pull down the jaw 37 for retaining a shingle-block between the spur-rolls 39 thereof and the opposing spur-rolls 34 below.

44 represents a shaft extending across the rear end of the machine. At one end of this shaft is a spur gear 45 which is driven by a pinion 46 provided upon a counter-shaft 47, the latter being driven by a power belt 48 passing about pulleys 47' and 10' mounted respectively upon said counter-shaft 47 and the arbor 10. The gear 45 is provided with a crank pin 49 which engages with a box 50 slidably mounted upon bar 51 which is arranged to vibrate in a vertical plane by being pivoted from its lower end to a support 52. Extending through the upper end of said bar is a pin 51' whose protruding ends are normally engaged by the hooked branches 53' of the head 53 of a pitman 53' whose other end, as shown in Figs. 1 and 4, is secured to a pin 54 which is secured to said carriage by lugs 54'. The above described mechanism is employed to afford reciprocatory motion to the carriage upon that side of the machine being considered, and the carriage upon the other side is desirably actuated from the shaft 44 by similar mechanical connections except that a crank-wheel 45' (Fig. 2) is employed in lieu of the gear 45.

Referring to Figs. 1 and 4, there is a reach-rod 55 extending longitudinally of the frame part 18 and connected at its forward end to the arm 56 of a horizontally swingable lever which is fulcrumed at 57 to the under side of a frame element 22 and having its other arm 56' project beyond the inside of the frame part 18, as represented in Figs. 2 and 7. Said reach-rod passes through a guide-way in the frame upright 21 and at its rear end is hingedly connected by a pin 58 to a rearwardly directed toggle element 59. Intermediate its length, the toggle element 59 is provided with ears 59' whereto connection is had by a knuckle-pin 60 with the lower end of the complementary toggle-element 61 whose other end is connected by a pin 62 to the rear end of an arm 63. The arm 63 is hingedly connected from its forward end by a pin 64 to the frame upright 21 and, when unemployed, the free end of this arm is supported upon a stop 65 which is disposed

so that the arm 63 will then offer no interference to the movement of said reach-rod and also so that the toggle element 59 will be suspended to assume the position in Fig. 1.

66 is a finger extending forwardly from the box 50.

When it is desired to stop the carriage the operator manipulates the lever arm 56' to give endwise movement through to the reach-rod 55 to move the toggle element 59 within the orbit of the finger 66 so as to be encountered by the latter in its ascending travel thereby transposing the toggle elements from the positions which they are shown to occupy in Fig. 1 to those whereat they are represented in Fig. 4. The toggle-joint thus exerts an upward thrust through the medium of the arm 63 to push the pitman-head upwardly from engagement with the bar-pin 51'. The pitman 53' being thus disconnected from the vibrating bar 51 results in the cessation of motion to the carriage. From the relative positions of the various parts which contribute to reciprocate the carriage, it is evident that the carriage can only be disconnected from the driving mechanism therefor when the carriage is at or in proximity to the forward end of its travel. Furthermore, the disposition of the toggle-joint parts is such, that when they are in the condition in which they are shown in Fig. 4, they are capable of sustaining the superposed weight of the pitman by reason of the extremity 59'' of the toggle-element 59 being engaged against the other element of the toggle-joint. To reengage the bar 51 and the pitman, the lever-arm 56' is swung by the operator so as to retract the reach-rod 55, whereupon the toggle-element 61 is brought into contact with a protuberance 68 upon the frame to cause the toggle-joint to be restored to its normal position, as in Fig. 1, and the lowering of the pitman into position whereat the pin 51' of the bar 51 may reënter the pitman-hook.

It is to be noted that the carriage is engaged and disengaged only when the crank-pin which imparts motion thereto is upon the dead-center, so to speak, and consequently, at a time when there is no ensuing motion in the carriage.

69 indicates a plate located upon and hingedly connected from its rear end by a pin 70 to the frame element 22 and to one side of the track-rail 32. 71 is a stub-shaft journaled in boxes secured to the machine frame and extending underneath the plate 69 whereat the shaft is provided with a finger 72 (Fig. 7) arranged at right angles to the shaft axis and normally directed toward the forward end of the machine. At the other end of the stub-shaft and within convenient reach of the operator is a crank-

arm 73 extending upwardly and having likewise a projection 74 extending downwardly into proximity to the lever-arm 56. By moving the lever-arm 56' forwardly, to render the carriage driving mechanism inoperative, the projection 74 is moved to swing the finger 72 upwardly to accordingly tilt the plate 69. With the plate 69 thus adjusted, in the next forward travel of the carriage, the wheel 43 rolls upon the previously tilted-up plate and, in being thus raised, elevates the jaw 37 through the instrumentality of the rod 40 and in opposition to the spring 75.

The purpose of raising the jaw is to allow of the substitution of a shingle block upon the carriage for the spalt, or remainder of a block from which shingles have been cut. In the machines with which I have been familiar, such opening of the jaws has been performed by manual labor, whereas, in the present invention, it is done automatically.

After a block is properly placed upon the carriage, and before movement is imparted thereto, the jaw 37 may be closed upon the block by allowing the spring 75 to assert itself through lowering the plate 69 from beneath the wheel 43 by further swinging the finger 72 toward the rear of the machine through the agency of the crank-arm 73, most conveniently applied by a push from the operator's knee. It may be stated that subsequent to the resumption of the travel of the carriage and while the latter is at the rear of the machine, the arm 73 is swung back by the operator to restore the finger to its original position. With such contrivances, it is apparent that the upper jaw can be lowered upon the block without rendering the carriage driving mechanism operative.

To facilitate the positioning of blocks upon the carriage and to supplement the spur-rolls 34 and 39 in supporting relatively large shingle-blocks during the sawing of shingles therefrom, I provide upon the carriage, as illustrated in Figs. 2 and 6, a series of disk-rollers 77 mounted upon a shaft 78 which is supported from the outer ends of arms 79 whose inner ends are each pivotally connected, as at 80, to the carriage. As best shown in Figs. 5 and 6, an extensible spring 81 yieldingly suspends the roller carrying shaft 78 from the carriage body above.

Shingle blocks, in being fed for cutting, are advanced unequally at the top and bottom with a consequent tilting of a block and to which action the spring 81 allows the rollers 77 to be responsively moved and yet bear up the block. Pivotally connected to the frame, or to an attachment 82 thereof, in proximity to the frame element 20 is a face-plate 83, shown in Fig. 7, which is utilized as an abutment wherewith a block is brought into contact when adjusting the same within the carriage. More particularly, said face-plate is disposed with its outer face flush with

the "saw line" (or the plane to which saw 14 cuts a block) when the face-plate is swung upwardly by the operator into the position indicated by dotted lines *a* in the view, and is then located to present a face within the plane to which the block should be set. The normal position of said face-plate is that at which it is represented by full lines in the view and whereto it is restored by a stud 84 projecting from the carriage pushing against the forward edge 83' of the face plate during the movement of the carriage toward the saw 14.

The set-works for advancing the block upon the carriage will now be described. 85 and 86 represent ratchet-wheels which are respectively secured to the ends of the spur-roll shafts 33 and 38 and are rotated simultaneously but to unequal degrees by pawls 85' and 86' actuated from two vertically movable bars 87 and 88 which pass through guides formed between the carriage member 20 and an offset plate 89. Antifriction rollers indicated by 89' are desirably provided to contact with the opposite edges of said bars. Connection is had between the pawl 85' and the bar 87 by a branch 85'' which is rigid with the bar. The pawl 86' is connected with the bar 88 by a lever 90 whose fulcrum pin 90' is carried by a bracket piece 90'' secured to the adjacent arm 36 of the swinging jaw 37, while the axis of the pin 88' whereby the bar 88 is secured to the lever is disposed to swing in an arc in proximity to the axis of the pins 35 about which the jaw 37 is swung. 91 represents a stop to limit the downward travel of the bar 87 by engagement with a nose 87' provided on the bar. A like service is effected with respect to the bar 88 by a stop 92 being impinged by the arm of lever 90 to which this bar is connected.

93 is a stud projecting outwardly from the head end of the machine part 18 and, as illustrated in Figs. 5 and 6, is disposed at a lower elevation than the bottom rail of the carriage track and rotatably mounted upon this stud is a cam-wheel 94. The cam-wheel is comprised of three parts whereof the main one is formed with a rim 95 concentric to the wheel axis and is connected with a hub 95' by a web 95'' positioned at about the midwidth of the rim.

In the rim and upon opposite sides of the web are series of openings 97 and 98 which are arranged so that the openings of one of such series will be in alinement with the arcuate portions 99 and 100 which intervene the openings of the other series.

The supplementary parts 101 and 102 of the cam-wheel are mounted upon the ends of the hub 95' of the main-part and are fixedly secured thereto and in adjusted positions as by set-nuts 103 engaging screw-threads provided upon the hub. Said sup-

plementary parts of the cam-wheel are characterized by having provided for each a series of peripheral faces 104 and 105 which correspond in number to that of the
 5 respective series of openings 97 and 98 in said main part. Said faces are severally disposed in planes which incline from planes radial to the axis of the wheel.

Pivotaly secured to the stud 93 is an arm
 10 106 extending forwardly with respect to the cam wheel and carrying at its free end a pin 107 which serves as a pivot for pawls 108 and 108' which are spaced to have their hooked ends engage in the openings 97 and
 15 98 of the cam-wheel where they are alternately presented. The pin 107 is connected by a link 109 with a lever-arm 110 which is swingable with a rock-shaft 111 supported in bearing on the frame and to the other
 20 end of the shaft is secured a treadle-arm 112. A spring 113 acting through the arm 110 tends to yieldingly hold the arm 106 against a stop extending from the side of the frame.

The operation of the set-works may be described as follows: Assuming that the cam-wheel is in the position in which it is shown in Fig. 5, then the carriage in its forward movement will carry the bars 87
 30 and 88 into juxtaposition with the cam-wheel, and the bar 88 will push against the end of an arcuate portion 99 of the main cam-part to give the cam-wheel a partial rotation. During this rotary movement the
 35 end of the bar 89 is brought against one of the faces 104 of the cam-part 101 with the result that such revolving face will act to raise the bar and cause the pawl 85' to transmit a relatively small rotary motion
 40 through the medium of ratchet wheel 85 to the spur-rolls 34. Meanwhile the bar 87 has encountered the outer surface of the cam-face afforded by an arcuate portion 100 and mounting upon the same in the progres-
 45 sive travel of the carriage the bar 87 is lifted to a greater extent than the other bar 88 which was affected by a cam-face 104. In being elevated, the bar 88 influences the lever 90 to thereby transmit through the
 50 agency of pawl 86' and ratchet-wheel 86 rotary motion to the spur-rolls 39 and to a degree less than that which is being simultaneously performed by the spur-rolls 34. By such mutual turning of the spur-rolls a
 55 block upon the carriage is advanced so that when carried to the saw a shingle will be cut with its point at the top.

The cam-wheel in the aforescribed action is brought into position so that at the
 60 following forward travel of the carriage, the bar 87 will effect the turning of the cam-wheel and be itself lifted to a small extent through the office of a cam-face 105 and the bar 88 is meanwhile raised upon the face of
 65 a cam-part 99 resulting in the spur-rolls

39 advancing the block at the top to a greater extent than it is advanced at the bottom by the coacting spur-rolls 34, or conjointly acting to protrude the block so that the next saw-cut will remove a shingle
 70 whose butt will be at the top.

Should it be desired, however, to cut successively shingles with their points or butts at the top or bottom, the operator will press down the treadle-arm 112 to accomplish the
 75 elevation of the pawls 108 and 108' to allow of one of them engaging in an opening 97 or 98 of the cam-wheel. Being thus engaged, when foot pressure is removed from the treadle, the spring 113 will retract the
 80 pawls accompanied by a turning of the cam-wheel into position to be engaged by the bars as in the preceding action, and not alternating, whereby it is evident consecutively cut shingles will be cut with their
 85 points similarly directed. The shingles, as cut, fall upon a table 114 which is supported from the machine frame by a swiveled bracket 115 to permit of its being swung
 90 back from the saw.

To protect the operator from being accidentally cut by the saw, as 14, when removing a shingle from said table, there are provided saw-guards 116 and 117. The
 95 former, 116, which is arranged to mask the teeth at the top of the saw, is formed of a board which is connected from above to the frame member 21 by hinges 116' so as to be swung over the frame member when
 100 unemployed. The other guard, 117, is designed to mask the teeth at the front of the saws and consists of an upright strip having a leg 117' which is supported by the machine frame and pivotally connected
 105 thereto by a pin 117'' to enable the guard being swung out clear of the saw. At the left hand side, in Fig. 2, the table 114 and the guard 117 are shown in operative position; while, at the right hand side of the
 110 view, these elements for the saw 14' are represented as being swung away from the saw.

Referring to Figs. 2, 3 and 7, there is located in front of each of the jointing-
 115 saws 17 and 17' a table formed of two parts 119 and 119' which are disposed in an inclined plane. Said table parts are spaced apart to accommodate the respective saw and are connected at their upper ends by a bridge piece 120 and severally connected
 120 from below by hinge-members 121, 121' with a shaft 122 which is rigidly supported by frame brackets 123. At the lower end of each table part is a forwardly projecting shelf 124, 124' and connecting the latter
 125 with the bridge-piece of the table are spaced guard rods 125 which serve to protect the hands of the operator when pushing the table rearwardly into the position indicated by broken lines *b* in Fig. 3 in opposition
 130

to a spring 126 which tends to yieldingly hold the table in the position in which it is represented by full lines in this view.

130 are guards respectively secured to the shaft 122, preferably, and extend upwardly in front of the saws 17 and 17' and the respective tables and then rearwardly over the saws are fastened to the machine members 127, 127'. Each of the guards is provided with a shelf attachment 128 (Fig. 3) extending into the interstices between the table shelves 124, 124'. Above the shelf attachment a guard 130 is provided with a sight opening 129 which is covered by a transparent plate (Figs. 2 and 3) of glass or an equivalent. The object of this plate is to prevent the operator's hand from being carelessly put through a sight opening. A shingle as cut from a block drops upon the adjacent table, 114 for example, whence it is properly placed by the operator against the part 119 of the adjacent jointing saw table and with one of its ends resting against the shelf 124. By pushing back against the shingle, the table is moved into the dotted line position *b*, Fig. 3, resulting in the saw cutting off a strip from one edge of the shingle to drop through the space between the table shelves. The shingle being thus "edged" at one side, the operator allows the spring 126 to swing the table to its normal position, whereupon the operator shifts the shingle across the gap between the table-parts onto the shelf 124 into the position to have the other edge of the shingle dressed when the shingle and carriage is again shoved back.

The adjustment of the shingle for edging is facilitated by the provision of the glazed opening 129, and the shelf 128 obviates any danger of the lower corner of a shingle being caught by shelf 124' when a shingle is being transposed from one side of a jointing saw to the other.

According to my invention, the jointing-saws are arranged so as not to interfere with the movements of the operator, and in edging, a shingle is moved sidewise to have its edges successively dressed and not by turning the shingles over, as hitherto.

The construction and operation of my invention will, it is thought, be understood from the foregoing.

In carrying out my invention, however, it is apparent that changes may be made in the structural details and without departing from the spirit of the invention.

What I claim is—

1. The combination with the carriage, the two sets of block feeding rolls thereof, a ratchet wheel for each set of rolls, and a pawl for the respective rolls, of two vertically movable bars operatively connected with the respective pawls, and a cam-wheel which is actuated alternately by the respec-

tive bars for elevating both of said bars to effect the unequal movements of the two sets of feeding rolls.

2. The combination of a reciprocatory carriage, feed devices for the carriage, and set-works for actuating the feed devices, said set-works being provided with two movable bars, a cam-wheel adapted normally to be alternately engaged by said bars to afford partial rotation to the cam-wheel whereby the bar which effects such movement to the wheel is elevated in unison with the other bar but to a lesser extent.

3. The combination with the carriage provided with upper and lower feeding rolls, and a cam-wheel, of vertically movable bars, operative connection between the bars and the respective rolls, said bars being arranged for engagement by said cam-wheel in the successive forward movements of the carriage whereby both of said bars are elevated to cause the feed rolls to be unequally actuated, and the cam-wheel being itself rotated to alternate the amount of feed applied through the bars to said rolls.

4. The combination of a reciprocatory carriage, feed devices for the carriage, set-works for actuating the feed devices, said set-works being provided with two movable bars, a cam-wheel adapted normally to be alternately engaged by said bars to afford partial rotation to the cam-wheel whereby the bar which effects such movement to the wheel is elevated in unison with the other bar but to a lesser extent, and means whereby the cam-wheel can be predeterminedly influenced to cause one of the bars to successively engage the cam-wheel instead of alternating, as aforesaid, with the other bar.

5. In a shingle-machine, the combination with the machine-frame, a carriage mounted for reciprocation in the frame, and a jaw hingedly connected to the carriage by pivoted arms, of a rod connected from its upper end to said jaw, a wheel carried by the lower end of said rod, a plate hingedly connected to the frame and means for swinging said plate upwardly whereby it will be presented to the wheel for causing the raising of the jaw during the travel of the carriage toward the head end of the machine.

6. In a shingle-machine, the combination with the machine-frame, a carriage mounted for reciprocation in the frame, a jaw hingedly connected to the carriage by pivoted arms, and a spring acting to retain the jaw in closed condition with respect to a shingle-block carried by the carriage, of a rod connected from its upper end to said jaw, a wheel carried by the lower end of said rod, a plate hingedly connected to the frame and means for swinging said plate upwardly whereby it will be presented to the wheel for causing the raising of the jaw in opposition to said spring during the travel

of the carriage toward the head end of the machine.

7. In a shingle-machine, the combination with a shingle-block carriage, and a jaw 5 hingedly connected to the carriage, of means to reciprocate said carriage, manually controlled means for selectively rendering the carriage reciprocating means operative or inoperative, and manually controlled means 10 made operable by the movement of the carriage for swinging said jaw upwardly.

8. The combination with the frame of a

shingle-block carriage, and feed rolls which serve to support a shingle-block adjacent to the front edge thereof, of arms pivotally 15 connected to the frame, rolls carried by the arms, and a spring connecting one of said arms with the frame whereby the last named rolls will furnish a yielding support to the block supplementary to said feed rolls.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."