April 5, 1955 J. F. LATTA 2,705,511

END TRIMMERS FOR SHINGLE SURFACING MACHINES

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Fig. 2

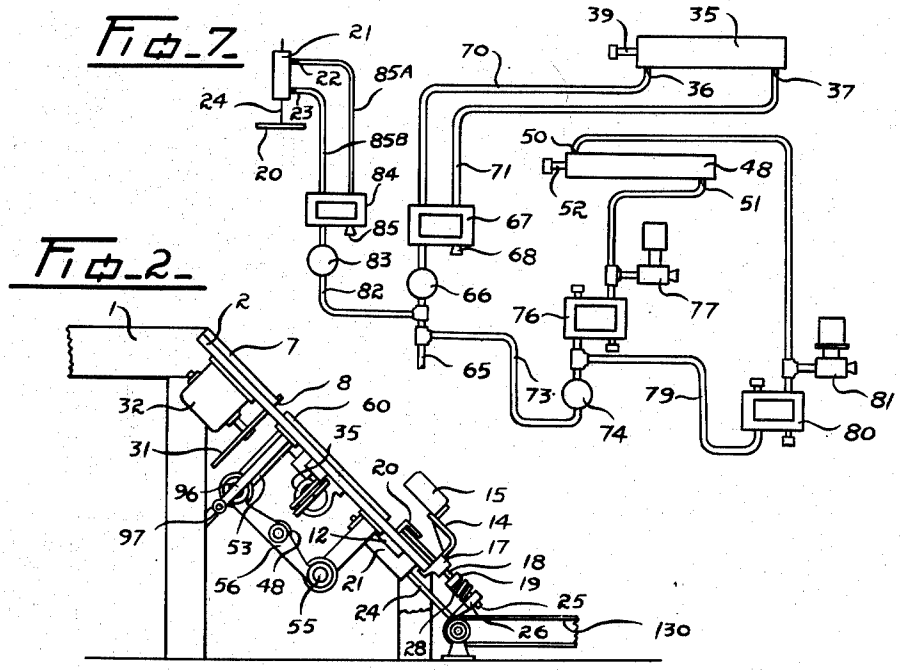
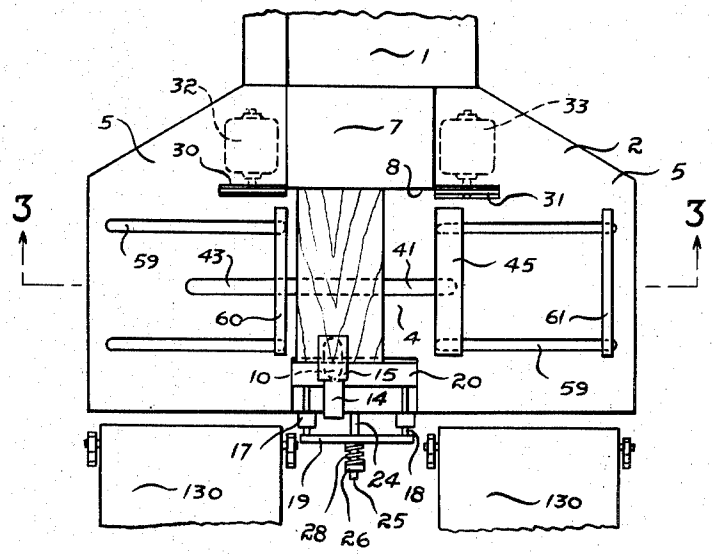


Fig. 1



INVENTOR
JOHN F. LATTA

Ernest F. Carver
ATTORNEY

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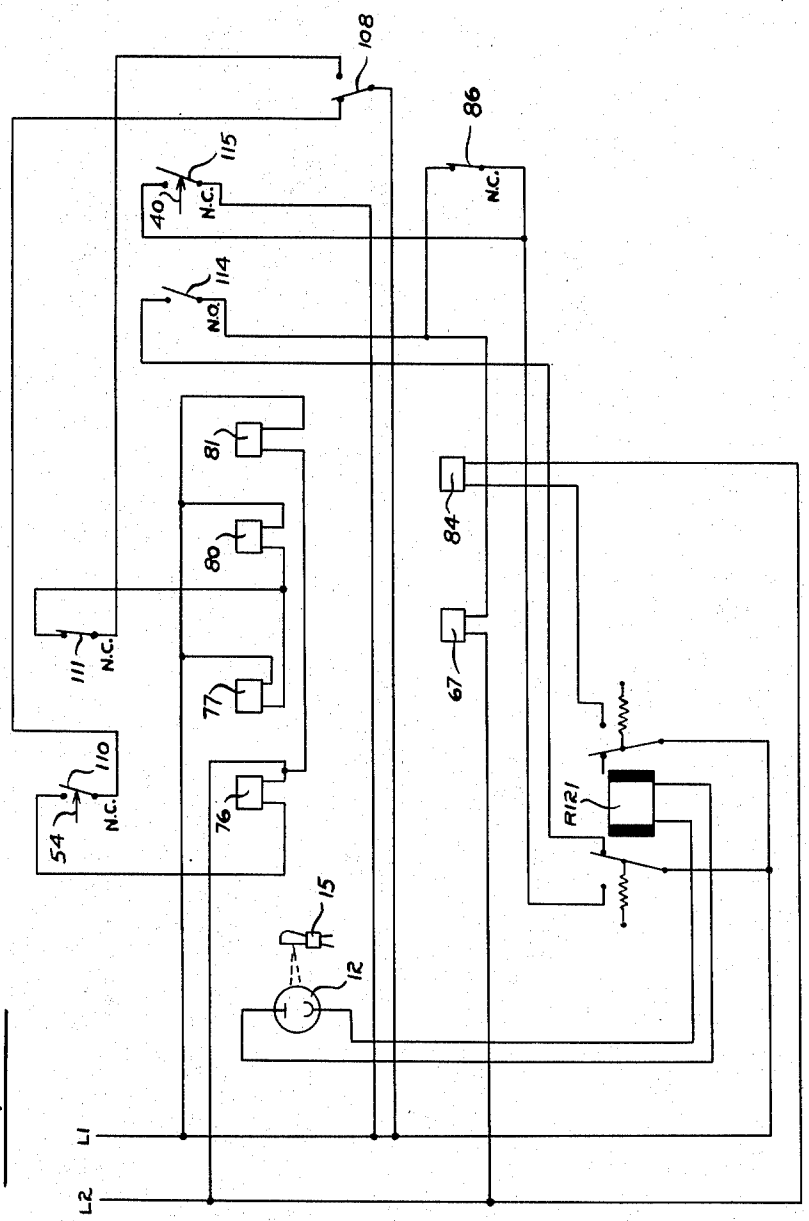

Fig. 8.

INVENTOR
JOHN F. LATTA
Francis J. Parker
ATTORNEY

April 5, 1955 J. F. LATTA 2,705,511

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Fig. 3

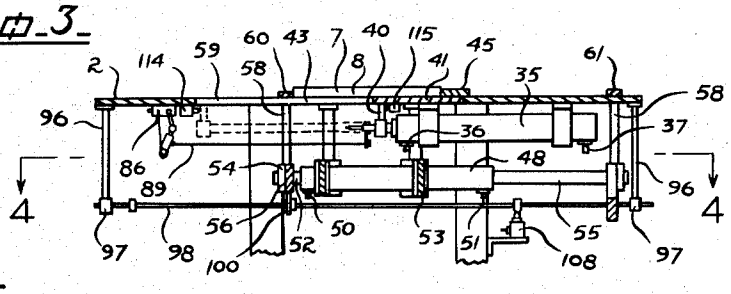


Fig. 4

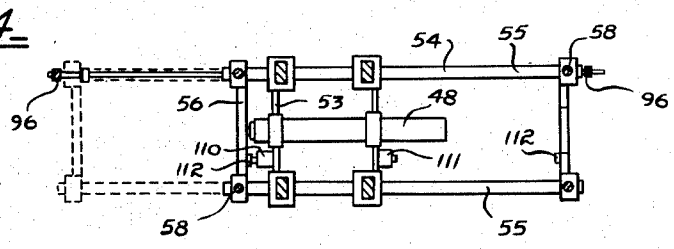


Fig. 9

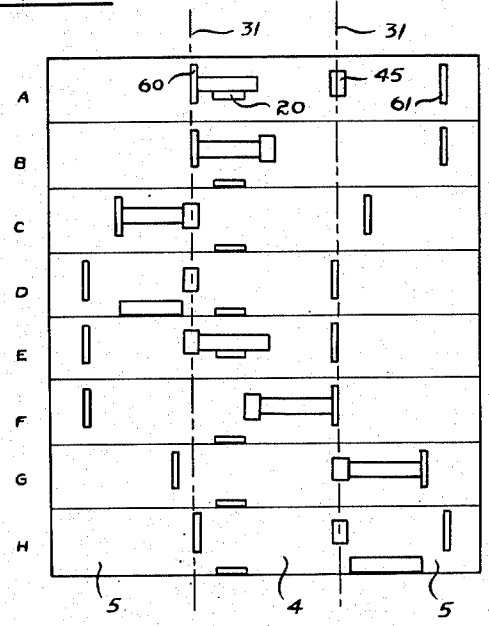
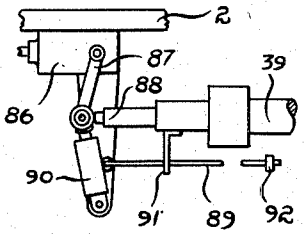


Fig. 5



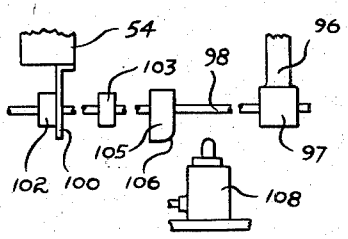


Fig. 6

INVENTOR
JOHN F. LATTA

Ernest E Carver
ATTORNEY

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2,705,511

END TRIMMERS FOR SHINGLE SURFACING MACHINES

John F. Latta, Vancouver, British Columbia, Canada

Application December 14, 1953, Serial No. 398,179

4 Claims. (Cl. 143—48)

My invention relates to improvements in end trimmers which is particularly adapted for use in trimming the ends of shingles as they emerge from the discharge end of a shingle processing machine.

The operation of the present day shingle processing machine is such that each processed shingle is discharged so fast that it cannot be end trimmed with accuracy before the next shingle is delivered to the trim saw. Therefore, it is an object of the present invention to provide two trim saws and means for feeding the shingle to the trim saws, and to provide a shingle gripping device which will receive each shingle as it is delivered by the processing machine and hold it firmly, irrespective of its width, to carry it across one of said trim saws. A further object is to provide a gripping device which will close rapidly onto the sides of the shingle without causing it to spring out of shape or suffer any damage from the gripping elements. A still further object is to provide means whereby the device remains at rest until a shingle is in place on the receiving member for trimming, so that the shingles themselves will become the timing means for controlling the operation of the trimmer.

While the device as herein to be described is dealt with in the trimming of shingles, it will be fully realized that it could be used equally well for the trimming of the ends of other panel stock.

Referring to the accompanying drawings:

Figure 1 is a view of the invention in plan.

Figure 2 is a side elevational view.

Figure 3 is a sectional plan view through the table taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view looking down and taken on the line 4—4 of Figure 3.

Figure 5 is an enlarged detail view of the means for reversing the travel of the main cylinder with the switch in open position.

Figure 6 is an enlarged detail view of the means for reversing the travel of the auxiliary cylinder with the switch in position to move the fence to the right.

Figure 7 (sheet 1) is a diagrammatic view of the air pressure cylinder controls.

Figure 8 (sheet 3) is a wiring diagram of the electrical circuits.

Figure 9 (sheet 2) is a diagrammatic view showing progressive steps A to H in the movement of the fences.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral 1 indicates the discharge end of a shingle groover or other processing machine from which shingles to be end trimmed are adapted to slide onto the bed 2 of the invention, see Figures 1, 2, 3 and 9. The bed 2 is inclined at a suitable angle for the shingles to slide freely down towards its lower end and is divided into separate areas defining a centre or receiving panel 4 and trimming and discharge side panels 5. The receiving panel 4 is provided with a plate 7 at its upper end having a lower edge projecting out from the surface of the panel 4 to provide an upper stop 8 for the shingles to be trimmed. An elongated opening 10 is formed near the bottom edge of the panel 4 beneath which a photo-electric cell 12 is mounted and secured to the panel is a bracket 14 which carries a source of light 15 to energize the cell 12.

Mounted at the base of the bed 2 is a pair of bearings 17 in which sliding rods 18 are guided for movement parallel to the bed. These rods are connected at their lower ends with a spacer bar 19 and at their upper ends

with a transverse lift member 20 upon which each shingle drops tip downwards to rest to cover the opening 10 and cut the beam from the source of light 15. A double acting air operated lift cylinder 21 is mounted behind the bed 2, see Figure 2, and has ports 22 and 23 and a piston rod 24, see Figure 7. The spacer bar 19 is fitted with a downwardly extending rod 25 which passes through an arm 26 on the free end of the piston rod 24 and is fitted with a coil spring 28 for the purpose of cushioning upward movement of the lift member 20 so as to prevent damage to the thin tip end of a shingle carried thereon.

The side panels 5 of the bed 2 are each slotted as at 30 to allow saws 31 mounted upon the shafts of motors 32 and 33 to project to trim off the butts of the shingles to a line at right angles to their side edges.

Mounted upon the rear of the bed 2 is a main air operated cylinder 35 of the double acting type having ports 36 and 37, see Figure 7, and a piston rod 39. The piston rod 39 is connected by a side arm 40 (Figure 3) to a slide 41 which is endwise movable in a slot 43 in the bed 2, see Figures 1 and 3. Mounted transversely of the slide plate 41 is a thrust fence 45 which is adapted to initially engage each shingle and move it to the right or left as the case may be. An auxiliary air operated cylinder 48, see Figures 3 and 4, is mounted horizontally of the bed 2, which cylinder is also double acting having ports 50 and 51, see Figure 7, and a piston rod 52. This cylinder is mounted on brackets 53 extending rearwardly of the bed and its piston rod 52 is connected to a rectangular frame 54 having sliding members 55 extending through the lower ends of the brackets 53 and connecting members 56, one of which is connected to an end of the piston rod 52. The corners of the frame 54 support pairs of standards 58 which extend through transverse pairs of slots 59 in the bed 2. Each pair of standards 58 carries an inclined auxiliary fence respectively indicated by the numerals 60 and 61 which obviously move in unison across the bed 2.

The lift cylinder 21 and the auxiliary cylinder 48 are operated from a source of compressed air from a main supply pipe 65, see Figure 7, which leads through a pressure regulator 66 to a solenoid reversing valve 67 which is provided with an exhaust 68 and is connected by pipes 70 and 71 to the ports 36 and 37 respectively of the main cylinder 35, so that pressure will always be on the piston rod 39 to move the main fence 45 in a desired direction and to hold said piston rod immovable at the end of each stroke. A branch pipe 73 leads from the pipe 65 and delivers air through a pressure regulator 74 to a solenoid valve 76 thence past a normally closed solenoid valve 77 and to the port 51 of the auxiliary cylinder 48. Air also leads through a pipe 79 to a solenoid valve 80, thence past a normally closed solenoid valve 81 and to the port 50 of the auxiliary cylinder 48. The valve 67 is adapted, when energized, to direct air pressure through the port 37 of the main cylinder 35 and when deenergized to direct air pressure through the port 36 and said valve is also adapted to exhaust the air to atmosphere from said cylinder through the exhaust port 68. The solenoid valve 76 serves to admit air to the port 51 of the auxiliary cylinder 48 and through an electrical circuit to be later described, said port is exhausted through solenoid valve 77. The solenoid valve 80 serves alternately to admit air to the port 50 of cylinder 48 and through another electrical circuit to be hereinafter described, said port is exhausted through the solenoid valve 81.

Another branch pipe 82 is fitted with a pressure regulator 83 and a solenoid valve 84 which are connected to the pipe 65. The solenoid valve 84 is provided with an exhaust 85 and is connected by pipes 85A and 85B to the ports 22 and 23 respectively of the lift cylinder 21. The valve 84 is actuated by a circuit controlled by the photoelectric cell 12, so as to direct air pressure through either of the ports 22 and 23 and to exhaust air to atmosphere through the port 85.

Mounted upon the rear of the bed 2 in alignment with the main cylinder 35 is a switch 86 (Figs. 3 and 5) having a spring tensioned toggle arm trip 87 which is adapted to be thrown over to open circuit position by a stem 88 on the free end of the piston rod 39 on reaching its outermost position, as when the thrust fence 45 has moved a

shingle to the left to the limit of its stroke, as shown in Figure 5.

A light rod **89** is connected to the spring tensioning member **90** of the trip **87** and extends through an eyed arm **91** attached to the piston rod **39** and is fitted at its free end with a stop **92**, so that as said piston rod reaches its innermost position the eyed arm **91** engages the stop **92** and moves the trip of the switch **86** to closed position.

A pair of standards **96**, see Figures 3 and 4, extend rearwardly of the bed and support guides **97** in which a rod **98** is slidably mounted. This rod is slidably engaged by an eyed bracket **100** secured to the frame **54**, see Figure 6. The rod **98** is fitted with two stops **102** and **103** and also a pressure member **105** having a rounded cam face **106** and suitably mounted on a stationary part of the bed structure is a press button double pole normally open and normally closed switch **108**. This switch is adapted to be operated to close one circuit as the frame **54** moves to the end of its stroke to the right and causes the bracket **100** to engage the stop **103** to move the rod **98** so that the member **105** engages the button of said switch and is adapted to be operated to close the other circuit as the frame **54** moves to the left and causes the member **100** to engage the stop **102** to withdraw the presser member **105** from the button of said switch. Push button normally closed switches **110** and **111** (Fig. 4) are disposed on stationary parts of the auxiliary cylinder mounting and are adapted to be alternatively engaged by stops **112** on the frame **54** to limit the travel of said frame and the fences **60** and **61**.

Mounted beneath the bed **2** in alignment with the slot **43** is a normally open switch **114** and a normally closed switch **115** (Fig. 3), both being of the push button type and adapted to be alternately engaged by the side arm **40** as the fence **45** reaches the limits of its travel.

The control of the air cylinders **21**, **35** and **48** is by line current energizing a relay **121** which controls the actuation of the several valves and switches hereinbefore described. With the trimmer at rest the photoelectric cell will be energized since light will be passing from the light source **15** to the photo-electric cell **12** and the relay **121**, see diagram Figure 8, will have its controlled circuit open. Assuming the fences **60**, **61** and **45** to be in the position shown in diagram A of Figure 9 and the air pressure to the supply pipe **65** to be on, as soon as a shingle falls to cut the light beam the relay **121** will connect line current to the solenoid valve **84**, energizing same and cause the cylinder **21** to function to raise the shingle to the stop **8**, see diagram A of Figure 9 and Figures 1 and 2. At the same time the relay **121** also causes line current to flow through the switch **86** to the solenoid valve **67** which supplies air to the main cylinder **35**, so that the fence **45** pushes the shingle across to the fence **60**, see diagram B of Figure 9. The initial movement of the fence **45** allows the switch **115** to close and supply current simultaneously with the relay **121** and as the auxiliary fence **60** is moved incidental to the thrust of the thrust fence pressing the shingle into engagement therewith the switch **110** is allowed to close. The closing of the switch **110** connects the line to the valve **76** which permits air to move the auxiliary fence in the same direction as the thrust fence with the shingle gripped therebetween and the same current opens the valve **81** to exhaust the piston end of the auxiliary cylinder **48**. The pressure regulators **66** and **74** are so adjusted that the main cylinder tends to lead the auxiliary cylinder, so that the shingle is firmly gripped between the fences and the line cut by the trim saw **31** which the shingle is passing, will be perfectly straight and true with respect to its side edges. When the shingle breaks the light beam to the photo-electric cell **12** the relay **121** is again energized and the valve **84** allows the member **20** to drop to its original position ready for the next shingle. The current energizing the valve **76** is sustained through switch **115** and switch **86** so that the fence **45** continues to move to the end of its stroke, see diagram C of Figure 9, and the fence **60** continues to move in the same direction whereby the fence **60** releases the shingle, see diagram D, and allows it to drop to be carried away by one of the conveyors **130**. As the auxiliary fence reaches the end of its stroke the switch **111** is opened and the switch **108** is reversed as in Figure 6, the fence **45** previously having closed the switch **114** and opened the switch **86** as shown in Figure 5.

It will be noticed that the solenoid valve **67** remains energized by line current through the energized relay **121** and the closed switch **114** so the thrust fence is held by air pressure at the end of its stroke. The device is now ready to receive another shingle from the processing machine and as said shingle drops similar functions take place as described above except that the valve **67** is deenergized to direct air presure through the port **36** and move the fence **45** to the right so as to urge the shingle into contact with the auxiliary fence **61**. Both fences will move as shown in diagrams E to H of Figure 9, to carry the shingle past its trim saw and finally release it to drop upon the second conveyor **130** for removal and such other processing as may be desired.

What I claim as my invention is:

1. A shingle trimmer comprising a bed divided into a shingle receiving panel and a trimming panel both lying in a single plane, said bed being inclined to permit shingles received to slide downwardly thereon, a stop adjacent the upper end of the receiving panel, a lift member adjacent the lower end of said receiving panel, a photo-electric cell below the face of the receiving panel, means for directing a beam of light onto said photo-electric cell, said beam of light being adapted for interruption by a shingle reaching the lift member, a trim saw mounted on the trimming panel, a thrust fence and an auxiliary fence adapted for movement transversely of the bed, separate means controlled by the photo-electric cell for imparting movement to the lift member and the fences subsequent to the interruption of the light beam by the shingle to be trimmed in the following steps, first to raise the shingle lift member to raise the upper end of the shingle into engagement with the stop, second to move the thrust fence to engage the shingle and move it into contact with the auxiliary fence, and third to move both fences simultaneously with the shingle gripped therebetween past the trim saw and beyond the light beam, means to sustain the moving means in operation after the path of the light beam is restored, and means to stop the thrust fence movement and to sustain the auxiliary fence movement to continue to release the shingle to discharge.

2. A shingle trimmer as claimed in claim 1, wherein a trimming panel is provided on opposite sides of the shingle receiving panel, each of which trimming panels is provided with a trimming saw and an auxiliary fence the second of which fences is coupled with the first named auxiliary fence, said fences being spaced apart on opposite sides of the thrust fence whereby a shingle is adapted to be gripped between the thrust fence and an auxiliary fence alternately and moved across its adjacent trimming saw, and means are provided for reversing the movement of the fences after each shingle is released from its engaging fences.

3. In a shingle trimmer having a shingle receiving panel and shingle trimming panels on opposite sides of the receiving panel, each of said trimming panels having a trim saw, a thrust fence normally at rest to one side of the shingle receiving panel, a pair of auxiliary fences spaced apart on opposite sides of the thrust fence, said auxiliary fences when normally at rest having one of them at rest adjacent the opposite side of the receiving panel to admit the placement of a shingle therebetween, means for lifting a shingle on the receiving panel into position for engagement by one of the trimming saws, means for moving the thrust fence into engagement with the shingle upon the receiving panel and for thrusting said shingle into gripping position between said fence and the adjacent auxiliary fence onto a trimming panel past its saw and means other than the thrust of the thrust fence for moving the auxiliary fence simultaneously with the movement of the thrust fence, said means serving to continue moving the auxiliary fence after the thrust fence has reached the end of its stroke.

4. A shingle trimmer comprising an inclined bed having a shingle receiving panel and a trimming panel on each side thereof, a stop adjacent the upper end of the shingle receiving panel, a trim saw mounted upon each of said trimming panels to trim shingles along a line parallel to the face of the stop, a photo-electric cell mounted adjacent a face of the shingle receiving panel adapted to be deenergized by the movement of a shingle onto said panel, a main cylinder having a piston rod, a thrust fence actuated by said rod to cause said fence to traverse the receiving panel, an auxiliary cylinder having a piston rod coupled to spaced auxiliary fences to cause them to traverse the trimming panels, a lift cylinder hav-

ing a piston rod coupled to a lift member adapted to receive a shingle as it is delivered to the receiving panel, said shingle when so received being adapted to disrupt a light beam directed onto the photo-electric cell, a relay actuated by said cell, a circuit for said relay, each of said cylinders having an electrically operated valve to control the fluid pressure thereto, said lift cylinder valve being included in the relay circuit and adapted to be energized ot raise the shingle into position to be trimmed, said main cylinder valve being adapted to be operated incidental to the energizing of the relay to move the shingle into engagement with the auxiliary fence, means actuated in response to initial movement of the auxiliary fence to energize the auxiliary cylinder valve whereby the shingle is moved across one of said saws while gripped between the fences, means actuated in response to the initial movement of the thrust fence to sustain the current to the main cylinder valve as the shingle is moved to expose the cell to its light source and a means actuated as the auxiliary piston rod reaches the end of its stroke for deenergizing the auxiliary valve.

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