Sept. 3, 1929. T. ROBINSON 1,727,307

TIMING MECHANISM FOR VENEER TRIMMERS

Original Filed June 21, 1926 4 Sheets-Sheet 1

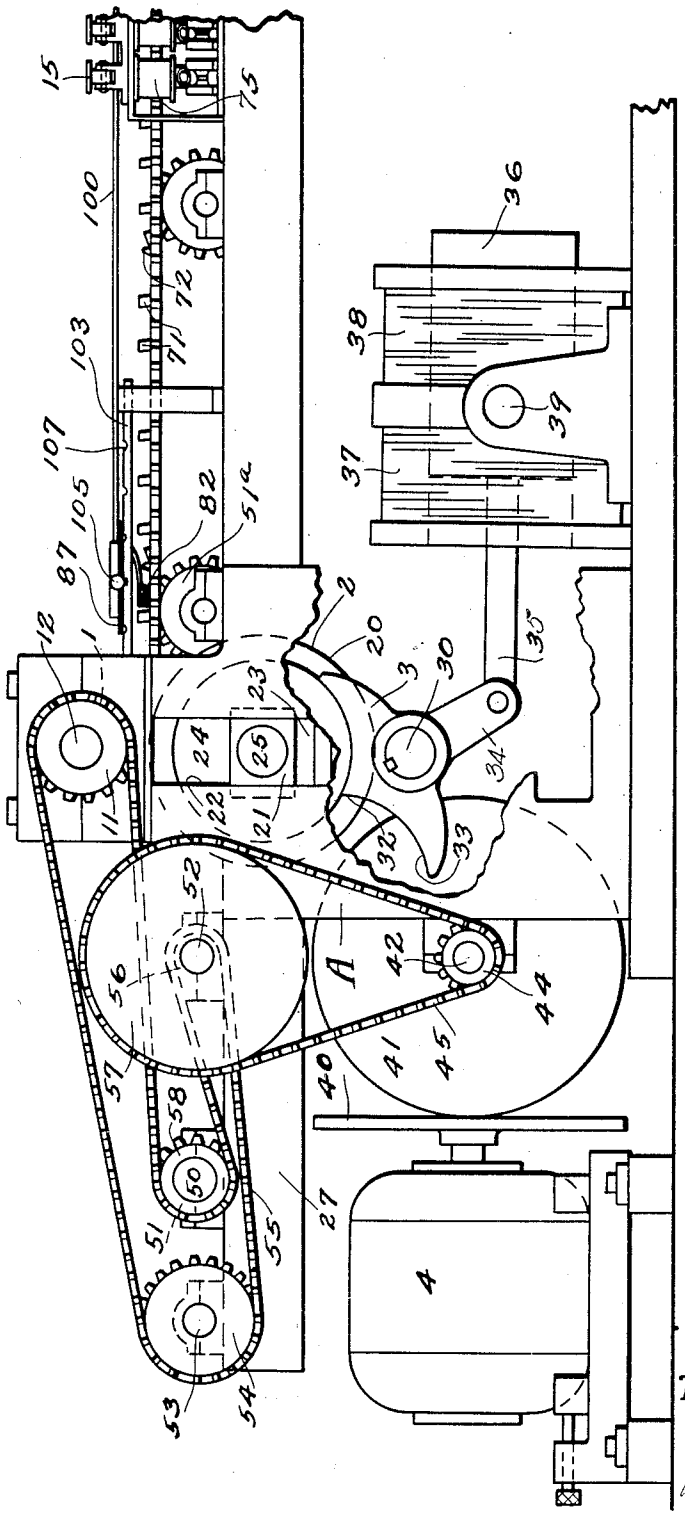


Fig. 1

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TIMING MECHANISM FOR VENEER TRIMMERS

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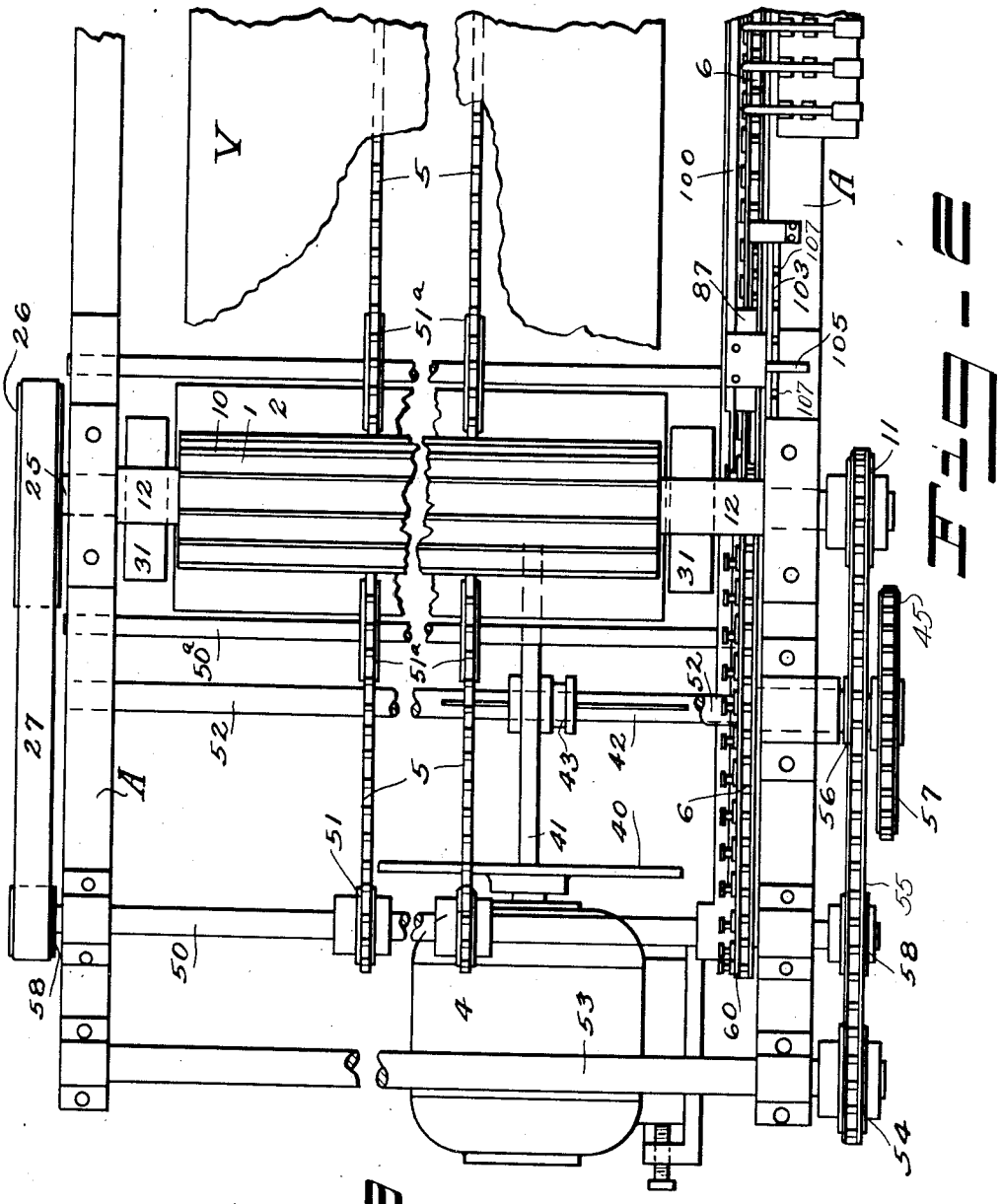


Fig. 2

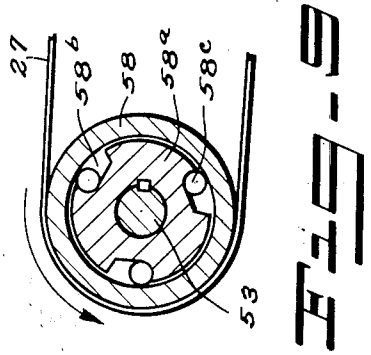


Fig. 5

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TIMING MECHANISM FOR VENEER TRIMMERS

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Fig - 4

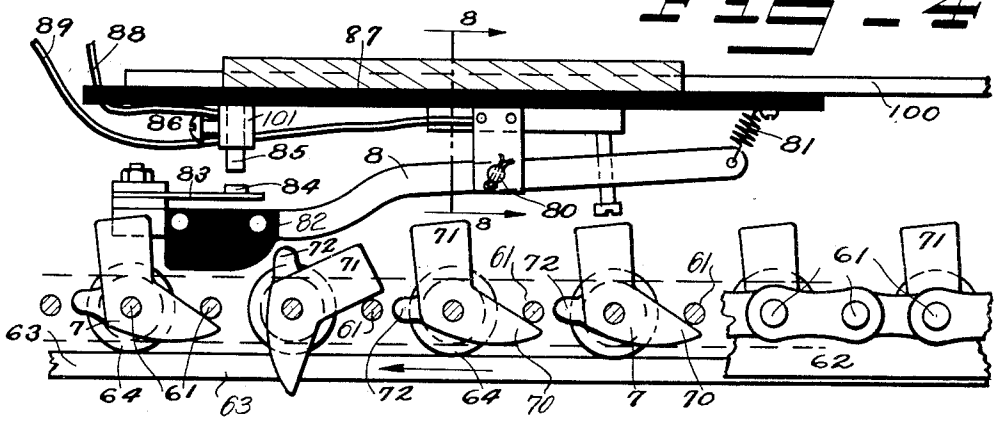
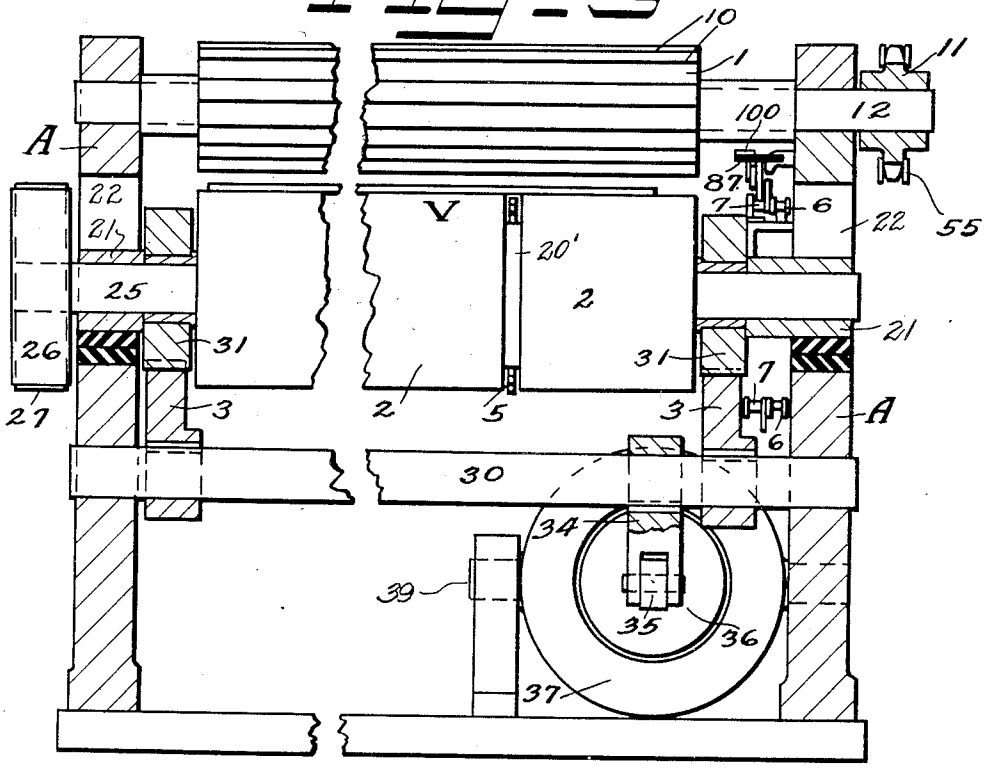


Fig - 3



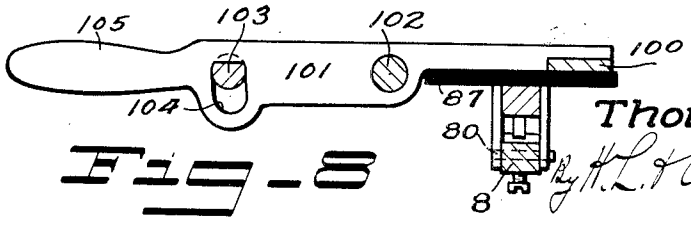


Fig - 8

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TIMING MECHANISM FOR VENEER TRIMMERS

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Fig. 5

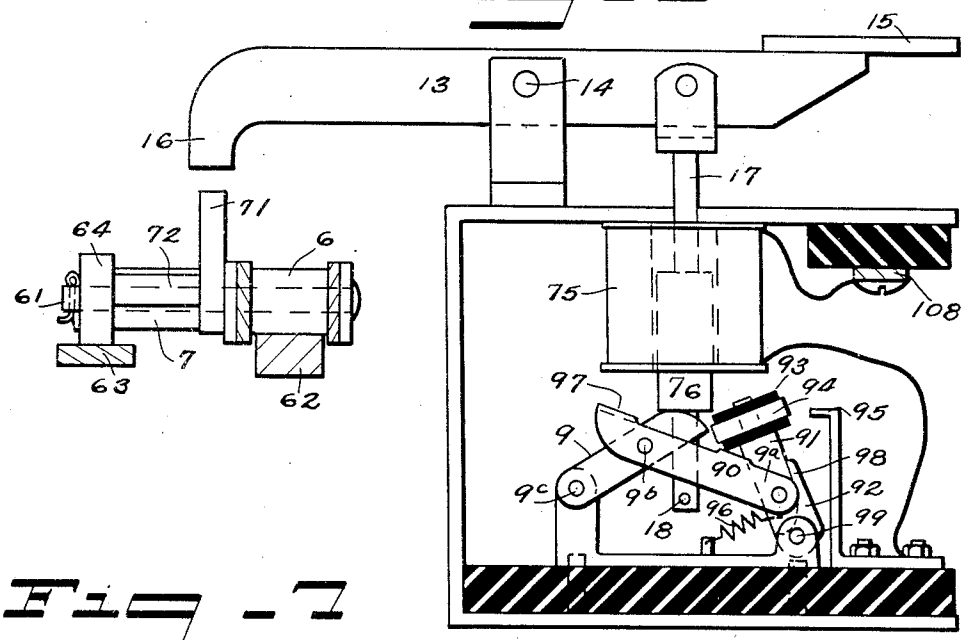


Fig. 7

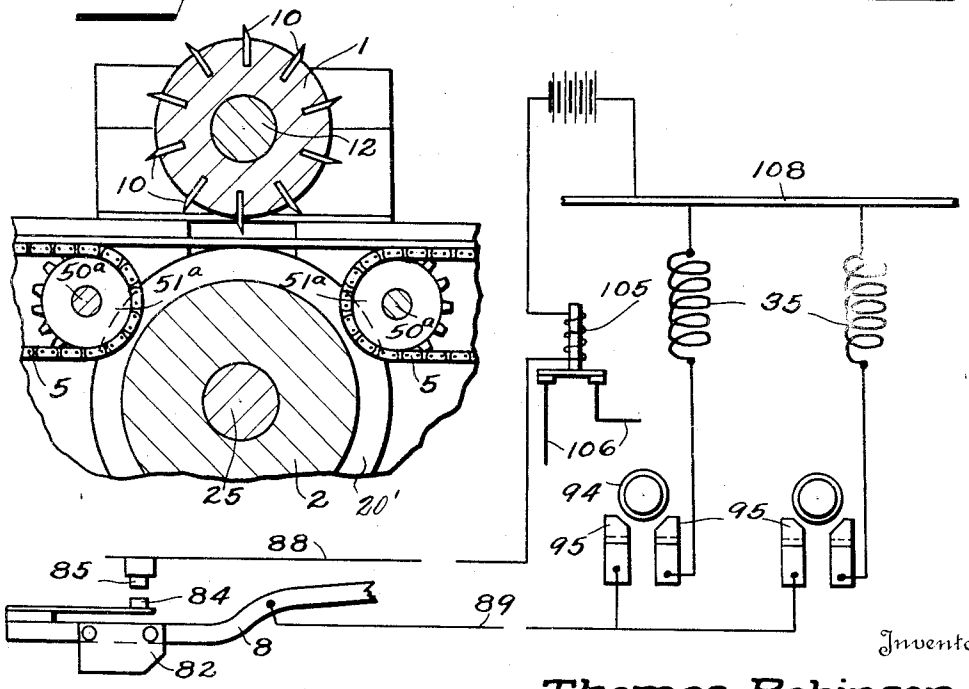


Fig. 6

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Patented Sept. 3, 1929. 1,727,307

UNITED STATES PATENT OFFICE.

THOMAS ROBINSON, OF EVERETT, WASHINGTON, ASSIGNOR TO THE COE MANUFACTURING COMPANY, OF PAINESVILLE, OHIO, A CORPORATION OF OHIO.

TIMING MECHANISM FOR VENEER TRIMMERS.

Application filed June 21, 1926, Serial No. 117,367. Renewed January 28, 1929.

My present invention relates to a timing mechanism by which the intermittent operation of a machine may be controlled to secure variable action of said machine, and consists of a construction capable of being set in advance of its action to vary the period of action of the controlled mechanism within the limits which the device has been designed to handle.

One special object sought is the ability to control the periodicity of operation of the associated machine by advance setting of the controlling apparatus, so as to vary the length of successive periods to any extent within the limits of the range of the apparatus, and one with which a series of control settings may be made at one time. Further objects may be discerned by a study of the following specification, which specification and the accompanying drawings are specific to a veneer cutting machine. It is however, to be understood that the present invention may be associated with machines operating upon other products and having constructions differing from that of the machine disclosed. For an exact understanding of that which is covered by this patent reference is had to the claims terminating this specification.

Figure 1 is a side elevation of the machine;

Figure 2 is a top view or plan of the machine, a central break being made to avoid showing the full width of the machine;

Figure 3 is a transverse sectional elevation taken on the plane of the cutter and anvil rolls, without however sectioning said rolls;

Figure 4 shows a side view of a section of the automatic tripping or controlling chain and the complemental tripping parts;

Figure 5 is a view showing in elevation upon a transverse plane, the setting mechanism in its relation to the controlling chain, the latter being in section;

Figure 6 is a wiring diagram employed in connection with said setting mechanism;

Figure 7 is a transverse section through the cutting and anvil rolls, taken on the plane of one set of feed chains, showing said chains and their relation to said rolls;

Figure 8 is a sectional elevation of the adjustable member which carries the scale;

Figure 9 is a transverse section of the ratchet mechanism employed in connection with the turning of the cutting roll.

The veneer jointing or trimming portion of the machine illustrated in the accompanying drawings will be herein described for better understanding of the operation of the timing mechanism, although they are not claimed in the present case but are claimed in my co-pending application, Serial No. 71,092, filed November 24th, 1925.

These jointing devices comprise rollers 1 and 2, mounted adjacent and superimposed to each other on parallel axes, and between which the veneer web is passed, the web traveling horizontally in the machine as shown.

One of these rollers, as 1, has a number of steel blades or cutter knives 10, extending lengthwise thereof, circumferentially and equally spaced thereon to conform to the width of the narrowest strip it may be desired to cut from the web. The spacing chosen in the machine illustrated is two inches. The widths of the sections cut from a web or sheet are a function of the unit distance represented by the spacing of these knives.

The roll 1 is journaled in fixed position in the frame. The complementary roller 2 is mounted so that it may be bodily moved towards and from the roll 1. As illustrated, this is done by journaling the roller 2 in blocks 21 which may slide in slots 22 or slideways in the frame A. The roll 2 is given a suitable exterior surface 20, as of wood or other material, against which the knives 10 may act in cutting the sheet without injury to the knife edges.

It is evident that if the sheet to be cut is fed between the two rolls 1 and 2, and these rolls be brought together at intervals, the sheet will be cut into strips or sheets of a width corresponding with the intervals elapsing between the approach movements of the rolls.

Either or both rolls may be reciprocated, but I prefer to reciprocate the lower roll 2. This movement is shown as secured for the roll 2 by the following mechanism: Upon each end of the shaft 25 of roller 2 is loosely journaled a roller 31. Keyed or otherwise rigidly fixed to shaft 30 are two lift blocks or cams 3. The upper surface of these blocks consists of two circular segmental faces 33, curved to conform with and fit the periphery of the rollers 31. This produces a peak or point 32 where the two curved surfaces join or meet.

It is evident that if any source of power is connected with the arm 34 so as to rock the

shaft 30 alternately in opposite directions, the roller 31 will be lifted by the peak or point 32, so as to bring it into contact with the cutting blades carried by the roller 1, thereby cutting across any sheet which is between the rollers.

The mechanism by which this lifting of the roller 2 is secured may be widely varied, as well as the means for actuating such mechanism. It is desired to employ an electrically energized means to secure this movement.

The type of electrical engine which it is believed will best fit the conditions, is the solenoid. I have therefore shown two solenoid coils 37 and 38, which have a common core 36, the core being connected by a bar or rod 34′ with an arm 34 securely fixed upon the shaft 30. The coils 37 and 38 are separately and alternately energized to thereby secure the opposite alternating movement for the core. I have shown the solenoid coils as mounted upon a pivot axis 39 to compensate for the slight angular movement of the rod 34′.

It is evident that other types of prime movers may be employed, as for instance an air cylinder connected in the same manner as the solenoid. One highly desirable feature is a direct connection and a mechanism which will act with promptness and accuracy of timing. One feature which it is desired to avoid is dependence upon any clutch, whether of positive or frictional character.

The rolls may be turned and the web feeding device operated from any suitable source of power. I have shown an electric motor 4 turning a friction disk 40, the latter cooperating with and turning a friction disk 41 slidably mounted upon a shaft 42. A collared or grooved hub 43 permits engagement with disk 41 to shift it along its shaft, thereby varying the rate of feed and operation of the device. This feature of variation of feeding rate may often be unnecessary, in which case it may be omitted.

The shaft 42, or an equivalent driving shaft, is suitably connected with the rolls to drive them and also with the web feeding means, of which the preferred arrangement is shown in Figures 2 and 7. Separate chains are preferably employed at opposite sides of the roll 2, and the roll 2 is provided with circumferential slots or grooves 20′, which receive the guide pulleys 51ª at one end of the conveyor chains 5. By using separate conveyor chains at opposite sides of the roll 2 and not carrying said chains over roll 2, the possibility of displacement of the chain so as to get it under the knives, is prevented.

In the construction illustrated, a chain 45 connects a pinion 44 on the shaft 42 with a gear 57 on an idler shaft 52. Shaft 52 has a gear 56, over which passes a drive chain 55, which passes in succession over gear 54 on shaft 53, gear 11 on shaft 12 of the cutter roll, over gear 51 on shaft 50 and thence back to gear 56 on shaft 52.

The lower or anvil roll 2 is driven by a belt 27 passing over pulley 26. The driving ratio between the two rolls 1 and 2 is preferably such that the roll carrying the knives has a slightly greater circumferential speed than the other, while at the same time providing a yielding construction in the drive for the roll 2, which will secure a momentary uniformity of movement at the time of cutting. This may be done by providing one of the pulleys, over which the belt 27 passes, with a ratchet or clutch drive. I have shown in Figure 9 such a device incorporated in the pulley 58. The rim 58 is loosely mounted on a center 58ª secured upon the shaft. Recesses 58ᵇ having inclined or cam inner faces, contain rollers or balls 58ᶜ, the whole forming a roller clutch of common construction. It is, therefore, possible for the roll 2 to be slightly accelerated at the time of cutting, this being communicated to it from the cutting or knife carrying roll 1.

The desirability for a circumferential speed in the knife carrying roller 1, greater than the rate of feed of the web being cut, arises from the fact that the cutting blades have a material thickness and are rather close together. Under conditions where two successive blades were cutting, if the two speeds were equal, the narrow strip cut off might stick between the knives and be carried around, which would interfere the next time either of the holding blades was used.

The jointer controlling or trip chain 6 is shown in top view in its relation to other parts of the machine in Figure 2, and in detail in Figures 4 and 5. The rate of movement of this chain conforms in a definite way with that of the feed chains 5. By this it is not meant that they have necessarily exactly the same rate of movement, but that any variation existing preserves a constant ratio.

For cutting a product such as wood veneer, which will shrink on drying and which at the time of cutting contains such an amount of moisture that shrinkage will occur, either the rate of movement of the veneer feed chains should exceed that of the trip chain enough to compensate for such shrinkage, or the unit of measurement of the feed chain should exceed that used in the timing or trip chain, in just the same way that the measurement unit in a shrink rule exceeds that of an ordinary rule.

The unit basis of length employed in the trip chain may be anything required in the service in which it is to be employed. For jointing veneer, a suitable unit of length for most work would be two inches. In the machine illustrated, I have employed this unit. This unit would usually be two inches plus a shrinkage allowance.

The type of link illustrated for the trip chain has two laterally projecting pins 61, which may be extensions of the link pivots of the chain. On the unit basis of two inches, these would be spaced two inches apart. Upon one pin of each pair is pivotally mounted a trip or contact dog 7. This has a central body from which extend three arms or fingers 70, 71 and 72, the fingers 71 and 72 being positioned in planes separated lengthwise of the pivot axis. The other pin 61 of the pair serves as a limit stop, successively engaged by the fingers 70 and 71.

The upper run of the trip chain rests upon guide and positioning bars 62 and 63. The pins 61, upon which the trip dogs 7 are pivoted, also carry rollers 64 which engage the guide bar 63. At a point where the chain first enters the upper run, any trip dogs which have their fingers 70 projecting, or as shown by one of these in Figure 4, engages a fixed member, not shown, so as to turn them all into the position in which the others are shown in Figure 4, which position may be called the normal position, the position in which the single dog is shown being the trip position.

At a point along the path of the trip chain, preferably close to the jointer rolls, is an electrical contact or switch controlling a circuit which is employed as a relay operating circuit for the jointing mechanism. The power member of this device, as shown, is the solenoid 37, 38. Figure 4 is a side view of the closing device for this relay circuit, and the chain elements by which it is controlled.

A lever 8, pivoted at 80, carries an insulating contact block 82 which is normally held down, or in position to hold separated the contact members 84 and 85, either by the weight of the parts or by the action of a spring, as 81, or by both. One contact member is preferably provided with a resilient support, as a spring bar 83, and one should be adjustable in position as is the member 85, through the action of screw 86. These parts are insulated from the machine, as by mounting on an insulating bar 87. Conductors, represented by 88 and 89, lead to the setting mechanism for the trip chain.

As the trip chain moves along towards the left in Figure 4, as indicated by the arrow at the bottom, the arm 72 of any trip block which has previously been placed in tripping position, will engage the insulating block 82 to close the break in the circuit at the points 84, 85, thereby energizing those magnets 35 of the setting system, see Figures 5 and 6, which have been connected by the depression of their keys.

The contact making and circuit closing device illustrated in Figures 4 and 6, or an equivalent mechanism, is duplicated as a means for controlling the current to the cutter operating solenoid, 37, 38. In this case the block 82 which is engaged by the trip finger 72 of the trip chain, is preferably placed as close as is feasible to the plane extending through the axes of rollers 1 and 2. Also it is desirable that the circuit directly controlled by such contacts, be that of a relay magnet by which is controlled the power circuit or whatever other source of power is used, thereby moving the anvil roll 2 sharply upward into contact with the sheet V to force it against one of the cutting knives 10 carried by the roll 1. These parts are so positioned and timed as to act only at the times when the knives 10 reach the cutting position.

To secure the automatic actuation of the cutting mechanism, it is only necessary to raise in advance that trip dog 72 which is spaced the desired distance following the last previously raised dog. It is possible to have a number of the trip dogs or fingers raised in advance, which will cause each in turn to actuate the cutting mechanism to cut strips corresponding in width with the spacing of the fingers which are raised.

The width of pieces cut from the veneer sheet are represented by the spacing of those trip dogs 7 which are turned into tripping position. To facilitate the tripping of the dogs needed to secure the desired width, I mount a scale 100 alongside of the course of the trip chain. This is plainly marked in inches, or whatever unit is desired. It is secured at one end, to the same plate 87, or other part which carried the contact closing block 82. This may be adjusted toward or from the cutting rolls as desired. I have shown plate 87 as secured to bars 101 (see Fig. 8) which are mounted to slide upon two rods 102 and 103. Rod 103 has notches 106 (see Fig. 1) spaced at unit distances apart, and bar 101 has a slot 104 permitting raising of the handle end 105 of the bar so that the bar may be lifted out of notch 107, and the whole device slid along to another notch 107. This adjustment may be omitted entirely, and if used would be merely as an adjustment which would change the zero of the scale in its relation to the cutters.

It is, of course, possible to turn the trip dogs into tripping position by direct hand engagement therewith. It will, however, be desirable to be able to do this by the use of a device which is analogous to a keyboard. Such a device is shown in Figures 1, 2 and 5. A series of like devices, of which one is shown in side elevation in Figure 5, are spaced apart the chosen unit distance in a bank extending alongside of the scale and the controlling or timing chain 6. In Figure 2 three are shown in plan view. Enough should be employed to cover a material distance, say six feet or even more.

Each of these devices consists of the following parts. A lever 13 is pivoted at 14 and

has one end 16 positioned adjacent to the fingers 71 of the trip dogs as they pass, and so that if this end be swung down upon its pivot, this end 16 will be brought into the path of travel of the finger 71 to rock the trip member or dog 7, so as to raise the finger 72 into position to later engage the block 82 and close the contact members 84 and 85. The other end of lever 13 may be provided with a finger plate or key 15.

Secured to lever 13 is a rod 17 which is secured to or forms a part of the core 76 of a solenoid coil 75. An extension of the rod 17 has a cross pin or a lateral extension 18, or is otherwise constructed and positioned to engage with two toggle levers 9 and 90, pivoted respectively at 9^c and 9^a, the latter pivot being common with that connecting two parts 91 and 92 of a compound arm, itself pivoted at 99. The upper end of this compound arm carries the movable contact member 94 of a switch device. Said contact member is shown as in the form of a conducting ring 94 mounted upon an insulating head 93.

When the toggle lever bars 9 and 90 are thrown down, the ring 94 will be caused to contact each of a pair of arms 95 (see Fig. 6), so as to close the break normally existing at this point in their common circuit. The lower end of the solenoid core 76 contacts with an end of link 9 so that depression of lever 13 depresses links or levers 9 and 90. A spring 96 normally holds these parts in the non-working position shown in Figure 5. This spring connects with a lower extension of the part 91 of the compound arm which carries the connecting member of the switch. A stop flange 98 limits their relative movement in one direction. The compound construction of the arm 91, 92 compensates for possible variations in proportions and position of the parts of the device.

Each bar of the pairs 95 is connected with its respective side of a circuit which includes the contact members 84 and 85, which are brought together by the action of the trip dog 72 of the timing chain 6. In the same, or in another circuit closed by the same movement of the points 84, 85, is the coil 105 of a relay magnet by which the power circuit 106 of the jointer operating solenoid 33, 34 is energized to thereby operate the jointer.

When the second break in the circuit is closed by the movement of the bar 8, all the solenoids 75 connected with the keys which have been depressed, will be energized, thereby pulling up the cores 76, which depresses the ends 16 of the levers 13, to thereby engage the arms 71 of the trip dogs and turn up the trip arms 72, so that as they reach the member 82 the jointing solenoid will be energized and the roll 2 be raised. A spring or the excess weight of the key end of arm 13, returns it to the position shown in Figure 5, in which end 16 clears arm 71. As the core 76 is raised, the pin 18 breaks the toggle joint formed by the links 9 and 91 and throws the head 94 forward, thus breaking the local circuit at this point.

A number of the key levers 13 may be pressed down at once, but none should later be pressed down until all but one of the trip dogs previously set have been in action. All levers which are down at one time are released together, thus simultaneously turning up a like number of trip dogs.

As the key or setting levers 13 are spaced unit distances apart, the operator may determine the width of the strip to be cut by the spacing of the levers depressed, or by the distance between the lever depressed and the tripping point represented by the block 82.

By the use of such a keyboard and its setting mechanisms, the device may be set in advance for a number of widths. It is also possible to be more exact and certain about the setting of the trip devices. Should a wrong key be depressed, time is available for correction.

By the use of a continuous feed for the veneer web, a much greater rate of cutting is obtainable than is possible where the veneer feed must be stopped before cutting.

It is believed that the operation of the device will be clearly understood upon reading the foregoing description.

What I claim as my invention is:

1. A setting mechanism comprising toggle-joint levers, a circuit closing member movable into circuit-closed position when the toggle levers are placed in aligned position, a spring acting to hold the toggle levers in buckled position, a setting bar, a solenoid having its movable member connected to operate the setting bar and to place said setting bar in operative position when the solenoid is energized.

2. A setting mechanism comprising a setting finger, a solenoid, a switch in the solenoid circuit, toggle levers connected with the movable member of said switch to close the switch when said levers are straight and to open the switch when the levers are buckled, the movable member of the solenoid being connected with the toggle levers to buckle them, and with the setting finger to throw it into setting position when the solenoid is energized.

Signed at Everett, Wash., this 8th day of June, 1926.

THOS. ROBINSON.