

Aug. 14, 1956

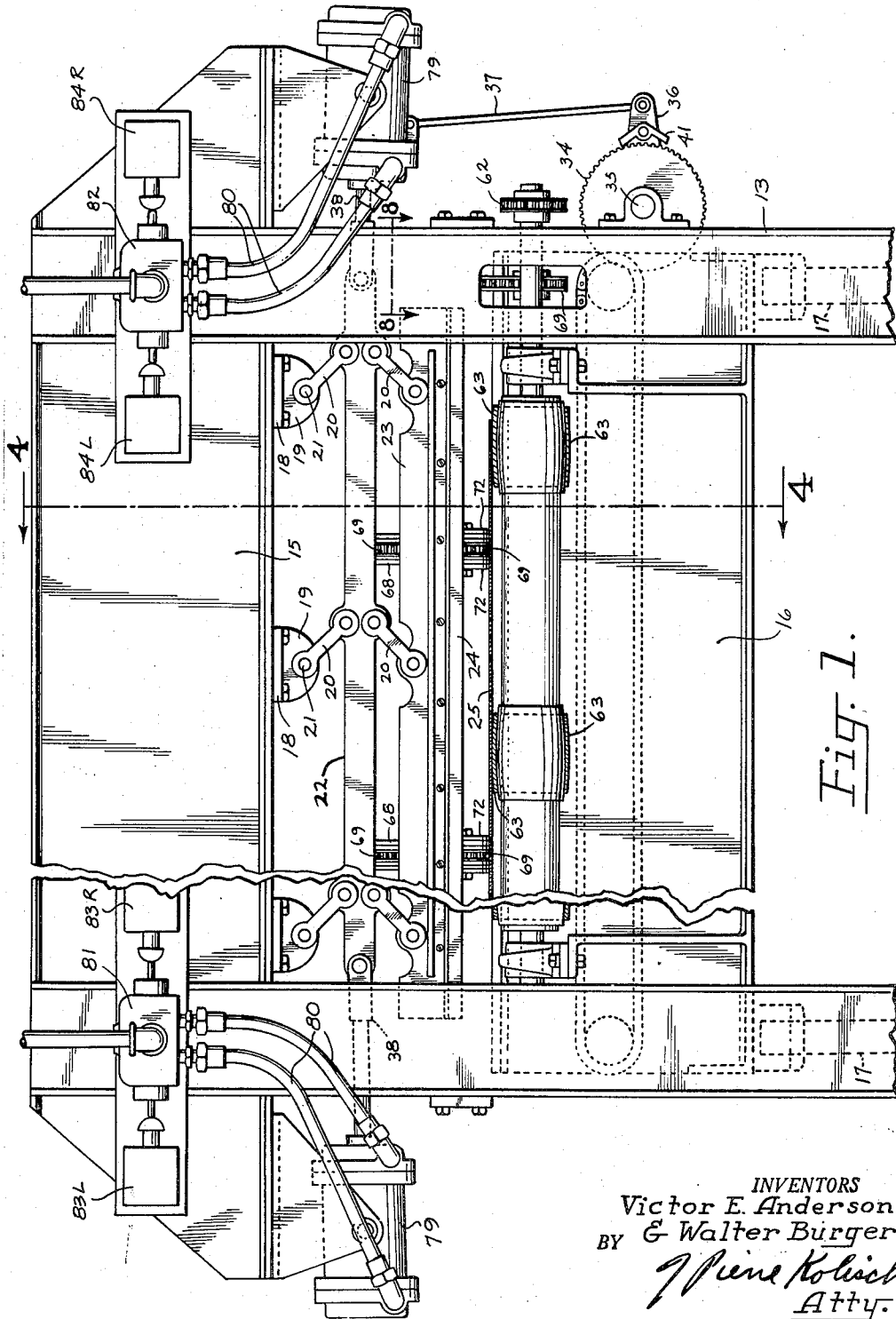
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2,758,649

VENEER CLIPPER

Filed June 8, 1953

6 Sheets-Sheet 1



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VENEER CLIPPER

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6 Sheets-Sheet 2

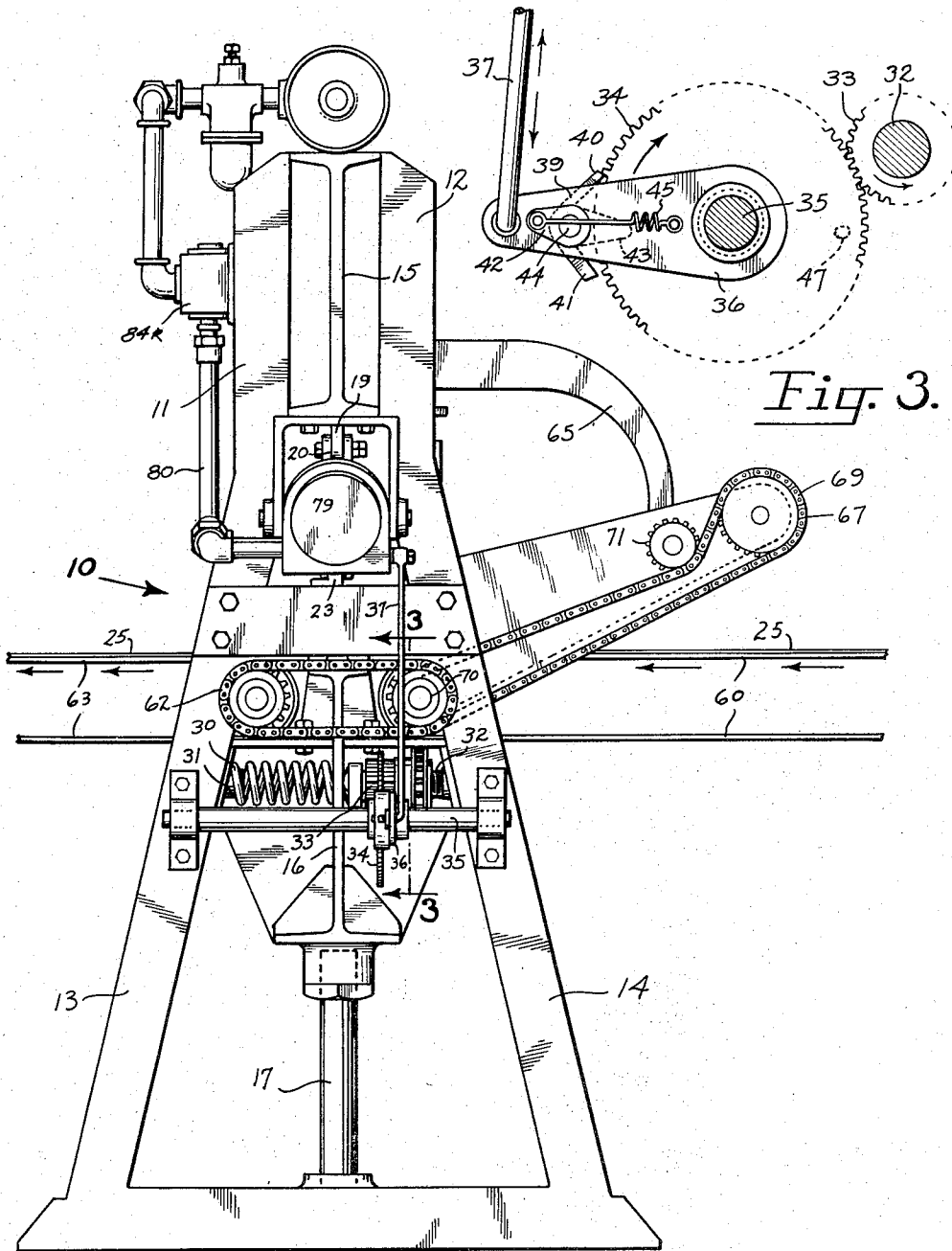


Fig. 2.

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6 Sheets-Sheet 3

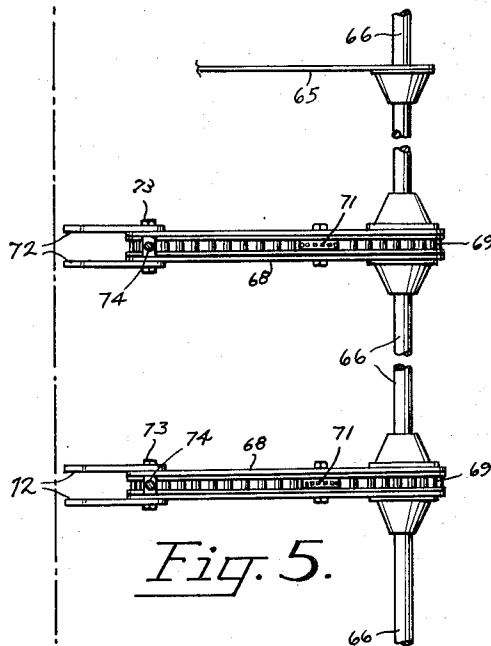


Fig. 5.

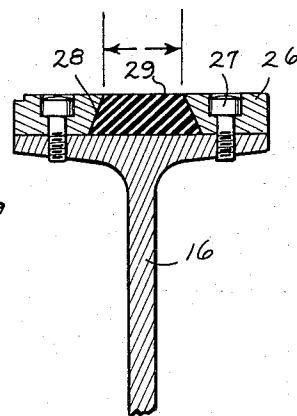


Fig. 7.

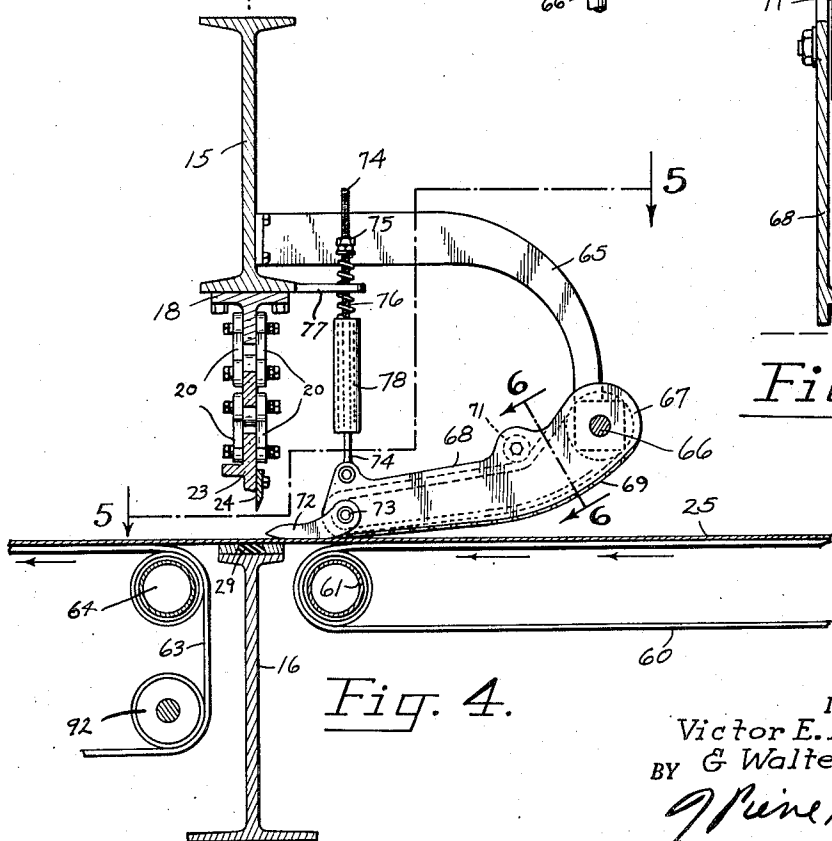


Fig. 4.

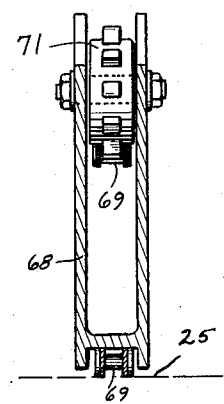


Fig. 6.

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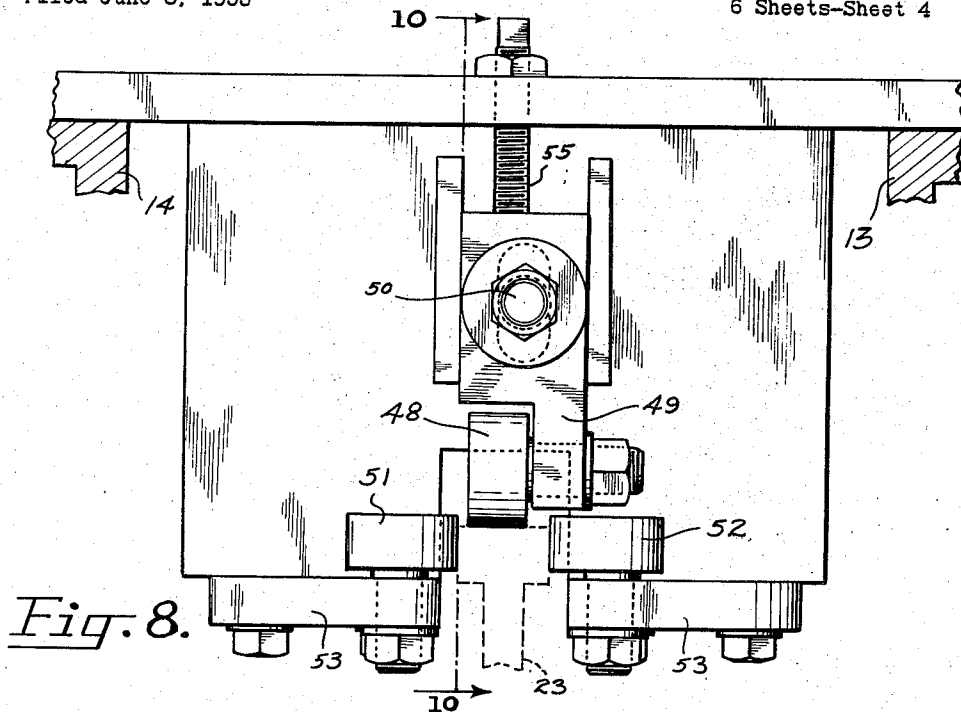


Fig. 8.

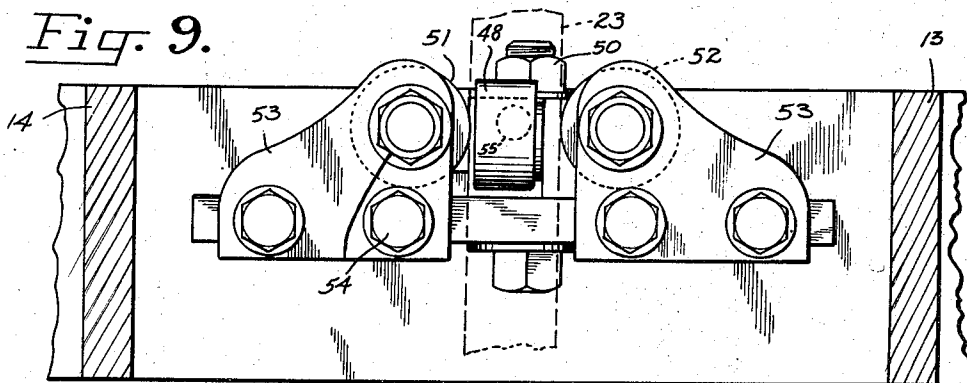


Fig. 9.

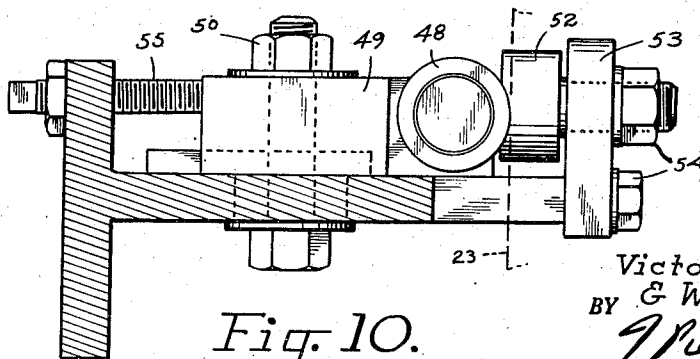


Fig. 10.

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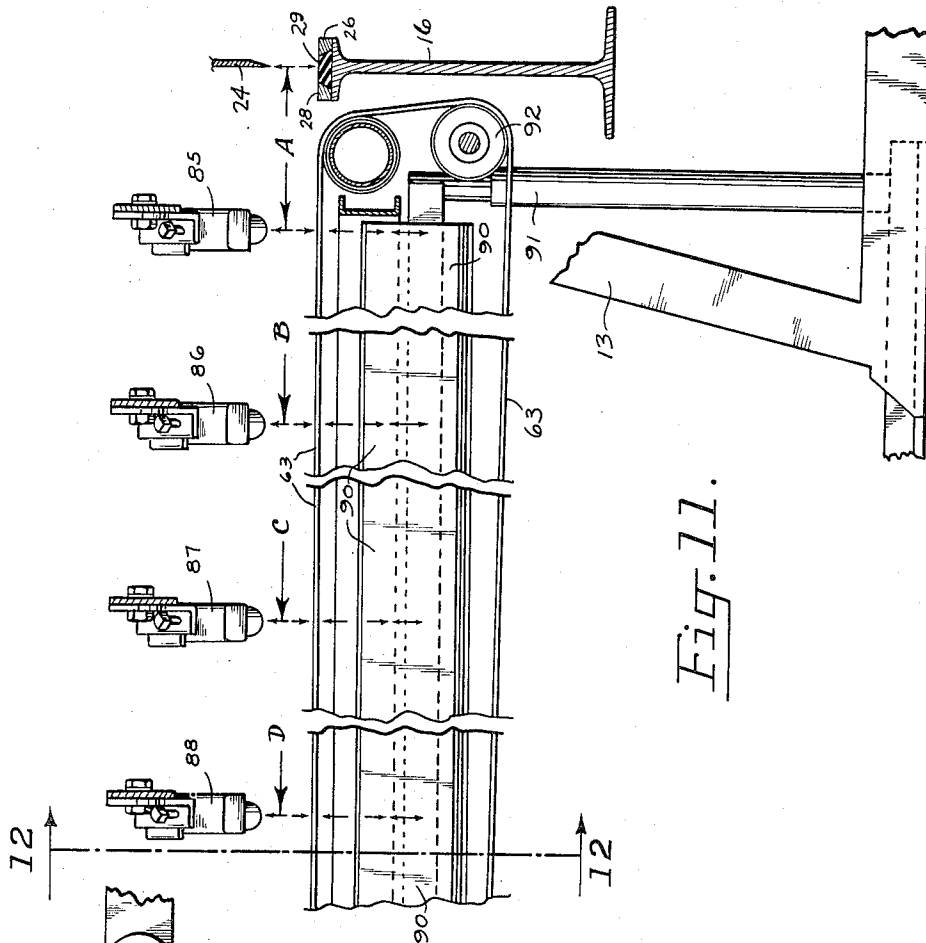


Fig. 11.

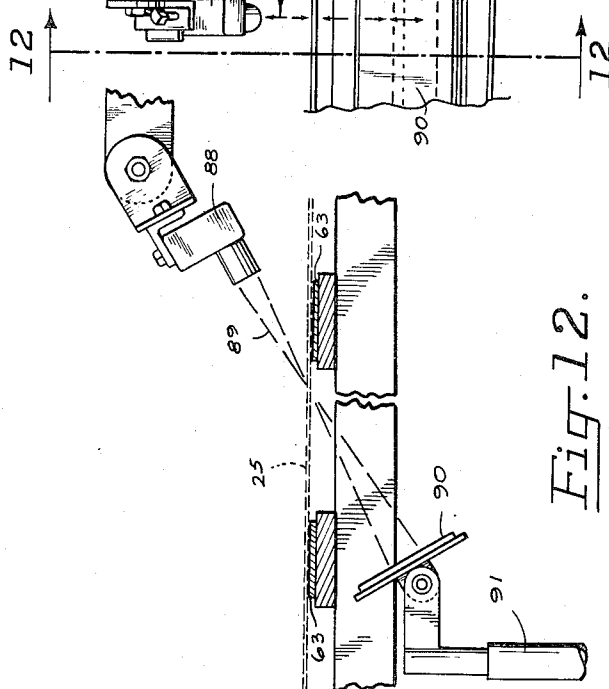


Fig. 12.

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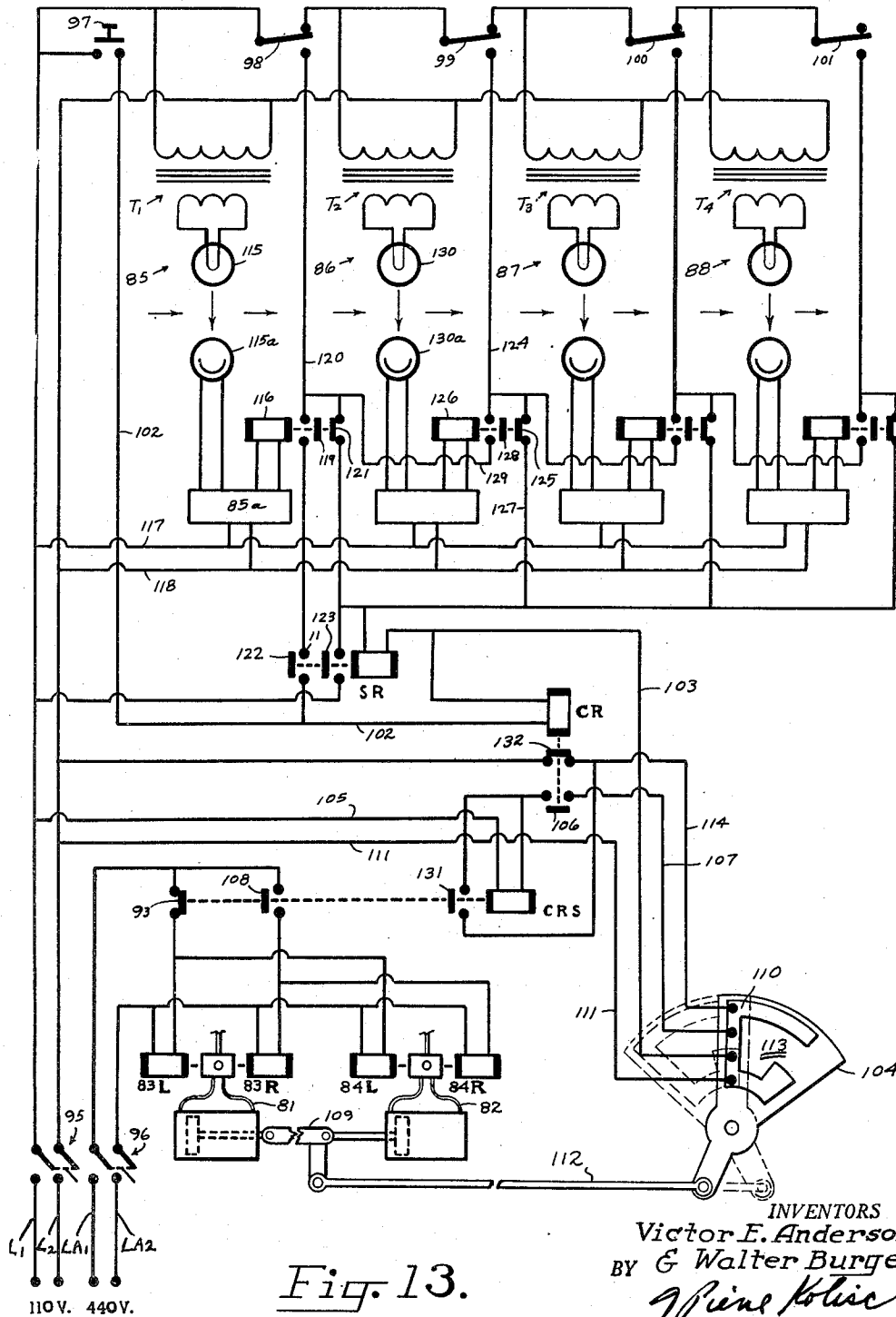


Fig. 13.

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2,758,649

VENEER CLIPPER

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Application June 8, 1953, Serial No. 360,154

5 Claims. (Cl. 164—56)

This invention relates to a veneer clipper such as is employed in the plywood industry to cut a continuous sheet of veneer into smaller sheets of predetermined size, which are later joined to one another to make up plywood panels.

Automatic veneer clippers for cutting veneer sheets into preselected sizes are known. The present invention is an improvement on such machines and its object is to accomplish more rapid and accurate clipping of veneer sheets. The improvements of the present invention reside in the mechanical construction and arrangement of the various parts of a clipper as well as in the electrical circuits for controlling the operation of the machine.

According to a feature of the invention, the machine is supported in a simplified, rugged, solid frame which will stand up under the heavy use to which such a machine is subjected.

According to another feature of the invention, a chain feed device is provided which will insure that the veneer to be cut is fed to the knife in flat condition.

According to another feature of the invention, a tilting device is provided for moving the surface against which the veneer is cut in order to obtain even wear across this surface.

According to another feature of the invention, the surface against which the knife cuts is a resilient member anchored in a channel in a supporting beam.

According to another feature of the invention, novel guide means are provided in either side of the machine for guiding the knife.

According to still another feature of the invention photoelectric cells are positioned and connected in a novel circuit arrangement to provide automatic control of the cutting operation in a simplified and inexpensive manner.

These, and other features of the invention will be fully explained in the following detailed description taken in conjunction with the drawings, in which:

Fig. 1 is a front elevation of the machine on the off bearing side;

Fig. 2 is a side elevation of the machine;

Fig. 3 is a section on the lines 3—3 of Fig. 2;

Fig. 4 is a section on the lines 4—4 of Fig. 1;

Fig. 5 is a section on the lines 5—5 of Fig. 4;

Fig. 6 is a section on the lines 6—6 of Fig. 4;

Fig. 7 is an enlarged section of the upper surface of the lower I-beam;

Fig. 8 is a section on the lines 8—8 of Fig. 1;

Fig. 9 is an inside elevation of the guide means shown in Fig. 8;

Fig. 10 is a section on the lines 10—10 of Fig. 8;

Fig. 11 is a side elevation of a portion of the machine showing the disposition of the photoelectric cells;

Fig. 12 is a section on the lines 12—12 of Fig. 11; and

Fig. 13 is a schematic diagram of electrical controls for the machine.

Referring to the drawings, the supporting structure for the machine comprises an A-frame, generally indicated

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at 10, having upper legs 11, 12 and lower legs 13, 14. An upper I-beam 15 is supported by legs 11 and 12 and a lower I-beam 16 is supported between legs 13 and 14 by vertically adjustable jacks 17.

Referring to Figs. 1 and 4, small plates 18 are fastened to the bottom portion of upper I-beam 15 and have a plurality of semi-circular plates 19 depending therefrom. Pairs of toggle links 20 are connected to either side of plates 19 by pivots 21. The other ends of links 20 are pivotally fastened to a driving rod 22. Other sets of links similar to 20 pivotally connect driving rod 22 with a bar 23 to which a reciprocally operated cutter or knife 24 is fastened. It will be apparent that when driving rod 22 is horizontally moved back and forth, knife 24 will be moved up and down.

Lower I-beam 16 acts as an anvil for knife 24 on which veneer 25 is cut. As best seen in Fig. 7, a plate 26 is provided in the top of I-beam 16 and is held thereto by bolts 27. A channel 28, having sides downwardly inclined away from one another, is provided in plate 26. A slightly resilient member of hard rubber-like material 29, having a cross section similar to channel 28, is anchored in channel 28, with its upper surface flush with that of plate 26.

In order to provide for even wear across the surface of member 29, means are provided for automatically deflecting or tilting I-beam 16 to the left and to the right so that knife 24 will not continually strike member 29 at the same place, but will cut against all surface portions of member 29.

Referring to Figs. 2 and 3, a coiled spring 30 is mounted at one end on a boss 31 extending from leg 13, and the other end of the spring engages the side of I-beam 16. The opposite side of I-beam 16 is engaged by the nose of a screw 32 mounted between leg 14 and the I-beam. Screw 32 is lengthened or shortened by the following mechanism: A small tubular-shaped gear 33 mounted on screw shaft 32 engages a large gear 34, rotatably mounted on shaft 35, fastened to the sides of legs 13, 14. There is also mounted on shaft 35 a link 36 connected at one end to rod 37, which is fastened to piston rod 38 connected to driving rod 22, whereby a reciprocal up and down movement is imparted to rod 37 every time the knife operates, as indicated by the arrows in Fig. 3, next to rod 37. There is also mounted on link 36, in cooperative relationship with gear 34, a pivotally mounted double acting pawl 39 having ends 40 and 41 adapted to contact the teeth of gear 34. A small link 42 is mounted on one side of larger link 36 and another small link 43 is mounted on the other side of link 36 and extends towards the center of gear 34. Pawl 39 and links 42 and 43 are pivotally mounted at 44 on link 36. The free end of link 42 has connected thereto one end of a spring 45, whose other end is fastened to link 36. The free end of link 43 is adapted to be engaged by a pin 47 mounted on the gear.

The tilting device operates as follows: each time rod 37 is moved, gear 34 will be stepped one notch by pawl 39, which movement is in turn imparted to the gear 33 which moves screw shaft 32 either against or away from beam 16. If, for instance, end 40 of the pawl is engaging the teeth of gear 34, the gear will be stepped around until pin 47 on the gear engages link 43, which will trip the pawl so as to bring end 41 into contact with the gear 35, and spring 45 holds the end of the pawl in contact with the gear. In this manner, the gear will be first driven clockwise and then counterclockwise as indicated by the arrows inscribed on the gear in Fig. 3. The relative size of the operating parts is such as to control the tilting of beam 16 so that it will reverse direction as the knife reaches the longitudinal edge of member 29.

Cutter knife 24 is guided by the following assembly

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mounted in opposite sides of A-frame 10. Referring to Figs. 8-10, it will be seen that the end of knife supporting bar 23 is T-shaped. The vertical end of bar 23 is contacted by a roller 48 suitably mounted on a bracket 49 which is fixed in place by means of nut and bolt arrangement 50. Another nut and bolt arrangement 55 adjusts the horizontal position of roller 48. Rollers 51, 52 contact bar 23 on its opposite faces adjacent where roller 48 contacts the bar. Rollers 51, 52 are mounted on suitable plates 53 and nut and bolt arrangements 54 permit horizontal and vertical adjustment.

As indicated in Figs. 2 and 4, veneer sheets 25 are carried into the clipper by conveyor belts 60 driven, in the direction indicated by the arrows, by drive shaft 61. Drive shaft 61 has mounted thereon a sprocket and chain drive 62 for driving conveyor belts 63 mounted on shaft 64 on the off bearing side of the clipper.

As the veneer 25 is carried by the conveyor belts 60 to the clipper, it does not lie flat but is curled because the veneer is usually produced by rotary peeling of a log against a lathe. In order for the clipper to function properly, the veneer should be in relatively flat condition when it passes beneath the cutter knife. The smoothing down of the veneer just prior to cutting is accomplished by the following mechanism. A depending arm 65 is fastened to upper I-beam 15. A shaft 66 extends through the lower end of arm 65 and has mounted thereon a sprocket wheel 67 which forms part of a guide supporting member 68. Sprocket 67 is connected by a chain 69 to a sprocket 70 mounted on drive shaft 61. An idler sprocket 71 mounted in guide supporting member 68 engages chain 69. Chain 69 is adapted to contact the veneer, as best seen in Fig. 6, and feed it towards the knife. A tapered finger 72 is pivotally mounted at 73 on guide supporting member 68 and assists in smoothing down the veneer as it is fed under the knife.

The degree of pressure with which the chain in the guide supporting member 68 and finger 72 contact the veneer is controlled by means of a spring tension member 74, having a nut 75 for controlling the tension of a spring 76. Member 74 is connected at one end to guide support 68, and near its other end it is supported by a bracket 77 extending from I-beam 15. A stop 78 surrounds member 74 and acts against bracket 77 to limit the vertical movement of guide support 68.

While only one of the guide supporting members 68 has been described, it will be appreciated, as seen in Fig. 5, that a plurality of these members are placed across the machine at the points where the veneer enters the clipper.

The reciprocal cutting movement of the knife is accomplished by means of actuation of driving rod 22, which is connected at either end to piston rods 38 which are connected to compressed air cylinders 79 and by suitable couplings 80 to valves 81, 82, which are controlled by solenoids 83L, 83R, 84L, 84R, operable on either side of the valves to drive rod 22 back and forth, thus, raising and lowering knife 24.

On the off bearing side of the machine (Fig. 11), four standard commercially available photoelectric cell devices 85, 86, 87, 88 are adjustably mounted in horizontal alignment at fixed distances from knife 24. The photoelectric cells automatically control the operation of the knife to cut veneer sheets into desired lengths. For instance, distance A is 12" from the knife to cell 85 and will, therefore, cut 12" veneer sheets, distance B to cell 86 is for 27" sheets, distance C to cell 87 is for 39" sheets, and distance D to cell 88 is for 53" sheets.

Each photoelectric cell 85-88 is a combination light sender and receiver mounted adjacent one another. As seen in Fig. 12, light beam 89 from cell 88 is directed to shine in the shortest path between the cell and veneer to a point through which veneer sheet 25 will be carried by conveyor belts 63. A mirror 90 pivotally supported on stand 91 is positioned between the reaches of belts

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63 and reflects beam 89 to the receiver in the cell. Idlers 92 are provided for belts 63 to make room for mirror 89.

The photoelectric cells are designed so that their relays are de-energized as long as they are receiving sufficient light. When this light is reduced or interrupted as by a veneer sheet, a thyatron in the device passes current which energizes the relay and a circuit is established which causes operation of the knife. The cells are interconnected so that when it is desired, for instance, to cut a 53" sheet of veneer, the knife will not operate until the beams of all the cells are interrupted. Likewise, if it is desired to cut 39", 24" or 12" veneer sheets, the light beams of all the cells between the cell which represents the desired length and the knife must be interrupted.

Referring to Fig. 13, the circuits which control the operation of knife 24 will be explained. Main power lines L1, L2 for 110 volt A. C. and lines LA1, LA2 for 440 volt A. C. are respectively connected by switches 95, 96 to the circuits. At an operator's position there are provided a manual cutting switch 97, a 12" cutting switch 98 for cell 85, a 27" cutting switch 99 for cell 86, a 39" cutting switch 100 for cell 87, and a 53" cutting switch 101 for cell 88. Transformers T1, T2, T3, T4, are connected to lines L1, L2 and provide a source of light for the cells.

When it is desired to control the cutting of the veneer sheets manually so as to cut the sheets in any desired lengths, manual cutting switch 97 is closed by the operator at the instant it is desired to operate the knife. When switch 97 is closed, assuming of course that switches 95 and 96 are also closed, current will flow in line L1, switch 97, conductor 102, the winding of a knife or cutter relay CR, conductor 103, rotary limit switch 104, conductor 111, back to the source over line L2. Solenoid operating relays CRS is energized over line L1, conductor 105, closed contacts 106 of CR relay, conductor 107, rotary limit switch 104, conductor 111 and back to the source over line L2. When relay CRS is energized, its normally open contact 108 is closed and the right hand solenoids 83R and 84R of valves 81, 82 are energized, permitting sufficient air to enter to move link 109 from left to right and thereby, via rod 112, move rotary switch 104 from position shown in solid lines to that shown in dotted lines. The normal position for link 109 is to the left in which the left hand solenoids 83L and 84L are energized over normally closed contact 93 of the CRS relay.

Rotary limit switch 104 has a C-shaped conducting portion 110 and a nonconducting portion 113, whose left hand vertical side is adapted to be engaged by the contacts of all the conductors terminating in the switch when the switch is in the position shown in solid lines in Fig. 13. When the switch is in the dotted line position, the contacts of conductors 107 and 114 contact nonconducting portion 113 of the switch.

When relay CR is initially energized and the knife operates, rotary switch 104 is moved into dotted line position. As switch 104 moves into the dotted line position, relay CR is deenergized because the contact of conductor 103 temporarily breaks with the conducting portion of the switch. However, the CRS relay remains energized over its own closed contact 131 and normally closed contact 132 of CR. As soon as CR is again energized, contact 132 opens and CRS is deenergized. When CRS deenergizes, its contact 108 opens and contact 93 closes, energizing the left hand solenoids and returning switch 104 to solid line position. When switch 104 is in dotted line position, CRS cannot be energized over contact 106 of CR because the contact of conductor 107 is on the nonconducting portion of the switch.

If it is desired to have the knife operate automatically to cut, for instance, 12" lengths of veneer, switch 98 is closed and transformers T2, T3 and T4 are deenergized. As soon as a sheet of veneer interrupts the light beam

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between elements 115, 115a of photoelectric cell 85, relay 116 is energized over line L1, conductor 117, photoelectric cell control mechanism 85a and back to source over conductor 118 and line L2, and contact 119 of relay 116 closes. Previously, as soon as cutting switch 98 was closed, a reset relay SR was energized over conductor 120, normally closed contact 121 of relay 116, winding of SR relay, conductor 103 to rotary limit switch, conductor 111, and thence back to the source over line L2. When relay SR is energized, its normally open contacts 122, 123 are closed and cutting relay CR is energized from line L1 over conductor 120, contact 119, contact 122, conductor 102 and conductor 103 to the rotary limit switch 104, conductor 111, and back to the source over line L2. The solenoids of valves 81, 82 operate in the manner described above in connection with the manual cutting switch 97, so that as soon as the CR relay is energized, the knife will operate and a 12" sheet of veneer will be cut.

If it is desired to cut 27" sheets of veneer, switch 99 is closed by the operator and transformers T3 and T4 are deenergized, and the cutting relay is energized as follows: line L1, open switch 98, closed switch 99, conductor 124, normally closed contact 125 of relay 126, conductor 127, winding of SR relay, conductor 103, conductor 111, and line L2 to the source. As soon as a sheet of veneer interrupts the light beam between elements 115, 115a of cell 85, contact 119, as previously described, closes. As the veneer continues its movement to the right, as indicated by the longitudinal arrows Fig. 13, it will interrupt the light beam between elements 130, 130a of cell 86, and relay 126 is energized and closes its contact 128. As soon as contact 128 closes, current will flow from conductor 124 over conductor 129, closed contact 119, conductor 120, closed contact 122, conductor 102, winding of CR relay, conductor 103, conductor 111 and back to source over line L2. The CRS relay operates in the manner previously described as soon as contact 106 of the CR relay closes, and the valves 81, 82 are operated in the same manner as previously described.

When it is desired to cut 39" or 53" sheets of veneer, switches 100 or 101 are closed, and the device will operate to energize the CR relay in the same manner as previously described with respect to switches 98, 99.

From the foregoing, it will be appreciated that my invention encompasses improvements in the construction and control of veneer clipping machines. Various changes and modifications will be suggested to those skilled in the art, but it is intended to cover all such changes and modifications and only limit the invention as defined in the appended claims.

We claim:

1. In a veneer clipper having a frame supporting a pair of transverse members one spaced above the other, a rod disposed substantially horizontally between said members connected on its upper side by toggle means to said upper member and by toggle means on its lower side to a knife, guide means on said frame for said knife, means for reciprocating said rod to effect vertical displacement of the knife and an anvil member having a

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resilient surface supported beneath said knife, the improvement which comprises a first means on one side of said anvil member for biasing it in one direction, a second means disposed on the other side of said anvil member for opposing said bias and to effect a slight displacement of the resilient anvil in one direction during each veneer cutting cycle, and a third means connecting said second means to said reciprocating means thereby to effect automatically the displacement of said resilient surface during each cutting cycle.

2. The improvement of claim 1, characterized by means for reversing the direction of displacement when limit of displacement in the one direction has been reached during a cutting cycle.

3. The improvement of claim 2, characterized in that the reversing mechanism comprises a pawl and ratchet combination actuated by said third means.

4. The improvement of claim 1, characterized in that said biasing means on one side of said anvil member comprising a spring and said second means on the other side comprises a horizontal screw mechanism actuated via gear means through said third means connected to the reciprocating means.

5. In a veneer clipper having a frame supporting a pair of transverse means one spaced above the other, a rod disposed substantially horizontally between said members connected on its upper side by toggle means to said upper member and by toggle means on its lower side to a knife, guide means on said frame for said knife, means for reciprocating said rod to effect vertical displacement of the knife and an anvil member having a resilient surface supported beneath said knife, the improvement comprising a spring extending from one side of the frame and biased against one face of the anvil member, a screw mechanism extending between the other face of said anvil member to the other side of said frame for opposing said bias, a gear integrally associated with said screw mechanism, an actuating gear supported adjacent said gear and meshing therewith, a pivot link and pawl means associated with said actuator gear, a rod connected at one end to said link and at the other to said reciprocating means for effecting the turning of said actuating gear by means of the pawl during up and down motion of said rod during a veneer cutting cycle thereby causing displacement of the resilient anvil surface via the turning of said screw mechanism through its integral gear and means on said actuating gear adapted to strike said pivot link to operate the pawl thereby to reverse the direction of displacement of said resilient anvil surface.

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