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WOOD VENEER CUTTER HAVING A PLURALITY OF KNIVES
OPERABLE SEPARATELY OR TOGETHER

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3 Sheets-Sheet 1

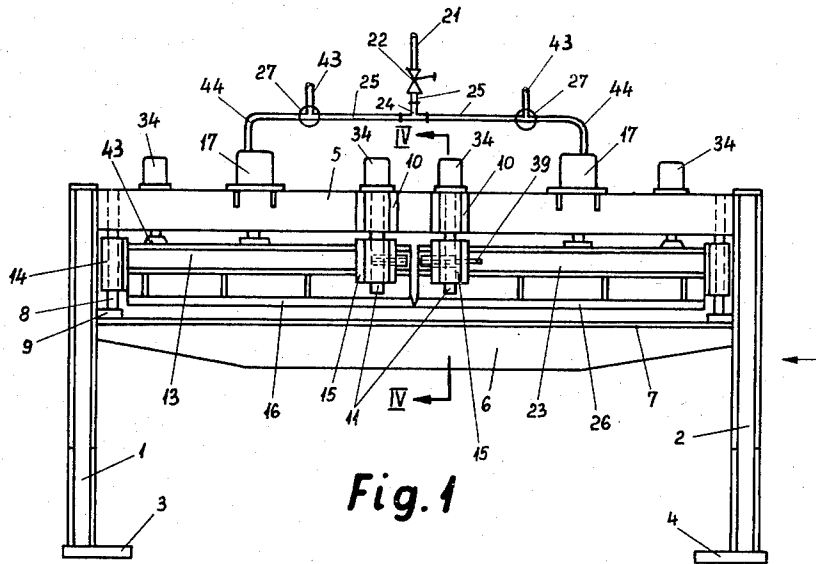


Fig. 1

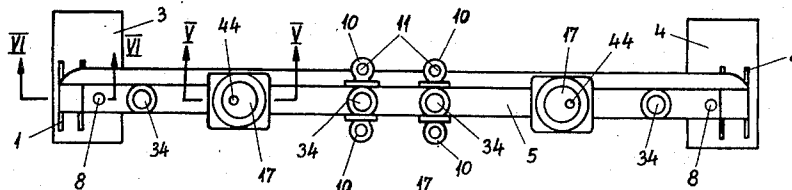


Fig. 2

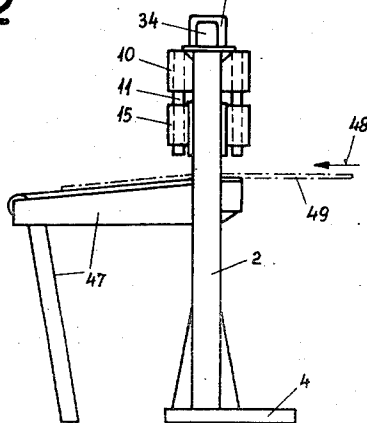


Fig. 3

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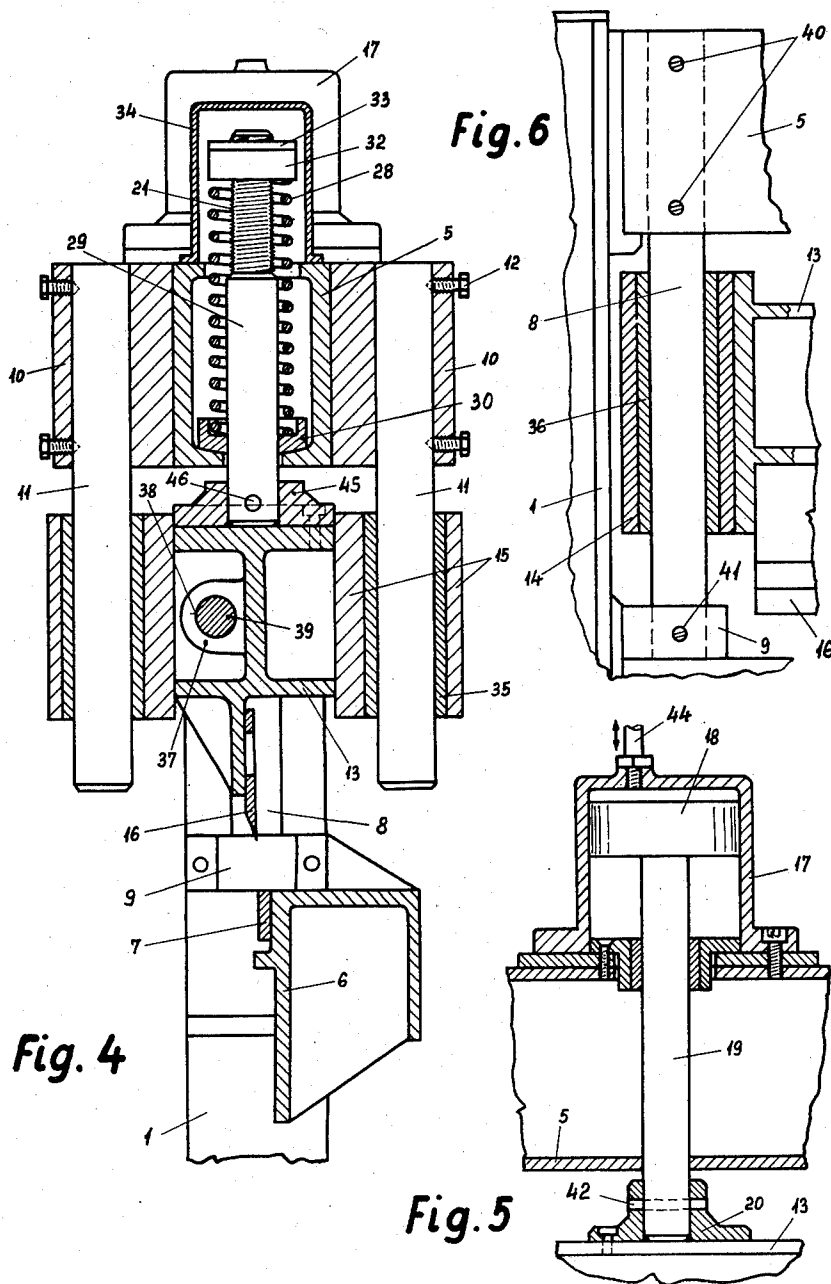
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3 Sheets-Sheet 2



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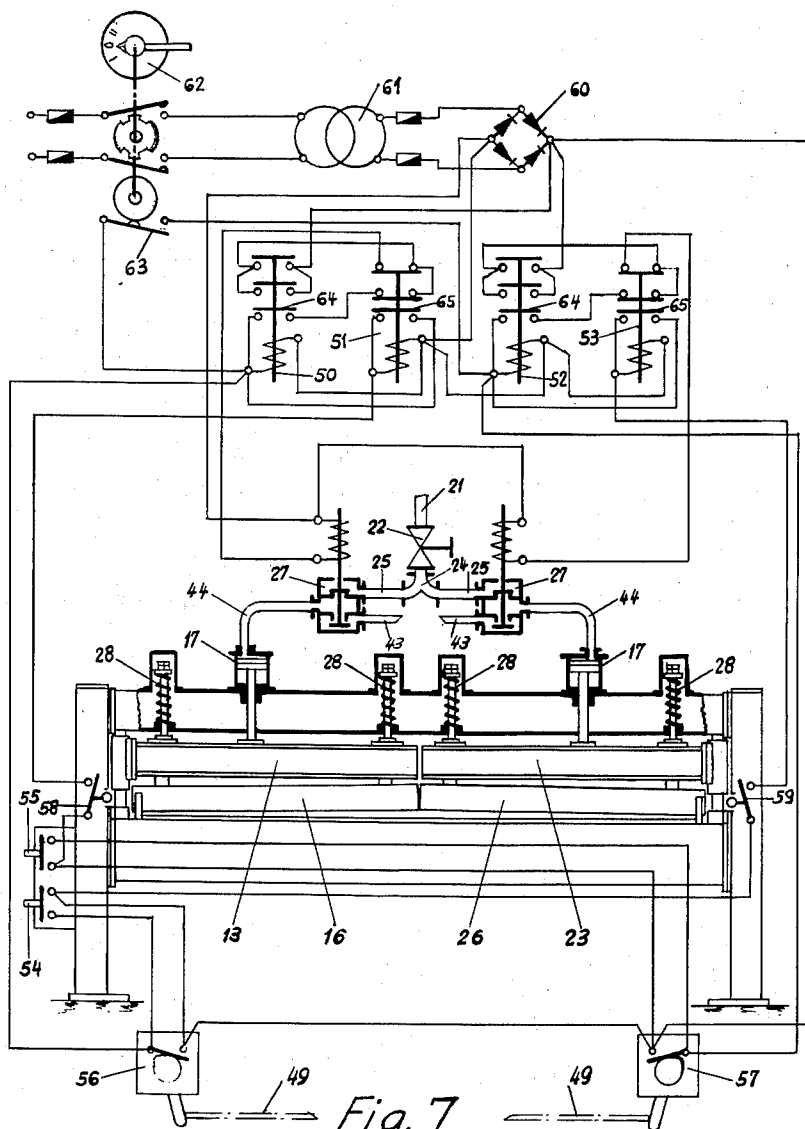
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3 Sheets-Sheet 3



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WOOD VENEER CUTTER HAVING A PLURALITY OF KNIVES OPERABLE SEPARATELY OR TOGETHER

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The present invention relates to a cutter for web-type structures and more particularly to a cutter for wood veneer strips or plates.

It is an object of the present invention to permit and effect a cutting of web-type structures in an improved and particularly efficient manner.

A further object of the present invention is the provision of a means facilitating the cutting of a plurality of strips extending parallel to each other into sections of different length.

Another object of the present invention is the cutting of wood veneer plates from webs and to allow for different width of such webs to be cut.

Still another object of the present invention is the provision of a cutter for wood veneer plates or strips having a plurality of cutting knives arranged in a common cutting plane in end to end relation in a manner so as to permit individual actuation thereof.

Still a further object of the present invention is the provision to a cutter for wood veneer strips in which the effective width of the machine is divided into a plurality of sections and each section having an independently operable upper knife cooperating with a common lower knife.

These and other objects of the present invention will become better apparent from the following description when taken in connection with the accompanying drawing, in which:

Fig. 1 shows a cutter in accordance with the invention viewed from the delivery end;

Fig. 2 is a top view of the cutter shown in Fig. 1;

Fig. 3 shows the cutter viewed from the side in direction of the arrow in Fig. 1;

Fig. 4 is a section taken along the line IV—IV in Fig. 2;

Fig. 5 is a section taken along the line V—V in Fig. 1;

Fig. 6 is a section taken along the line VI—VI in Fig. 1, and

Fig. 7 is a diagram of the electro-pneumatic control system of the cutter.

Referring now to the drawings, Figs. 1 to 6 show that the veneer cutter consists substantially of two vertical stands 1 and 2 each arranged on a foot 3 and 4, respectively, and forming together a frame. The two stands 1 and 2 are rigidly interconnected at their upper ends by a horizontally extending pressure beam 5. The two stands 1 and 2 are further interconnected by a bottom-knife or lower beam 6 which supports a stationary bottom knife 7 having an upwardly directed cutting edge. Beam 6 extends parallel with respect to beam 5.

Each of the two ends of the beam 5 holds the upper end of a guide bar 8 by means of a pair of pins 40 indicated in Fig. 6. The lower end of each guide bar 8 is secured by means of a pin 41 in a holding sleeve 9 rigidly attached on the stands 1 and 2, respectively.

Also arranged on the beam 5, on each side of its

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lengthwise centre, are two guide bar holders 10, in each of which a guide bar 11 is secured by means of screws 12. Guide bars 8 and 11 extend vertically downward from the pressure beam 5.

Extending intermediate the pressure beam 5 and the bottom knife beam 6 are two upper or top-knife beams 13 and 23, each of which is operable independently of the other and is provided at its outer end with a guide sleeve 14 slidably seated on the respective guide bar 8 and at its inner end with a guide sleeve 15 slidably seated on the respective guide bar 11. The top-knife beams 13 and 23 are thus slidable in vertical direction on the guide bars 8 and 11. Each of the two top-knife beams 13 and 23 carries an upper or top knife 16 and 26, respectively. The two top knives are so arranged on their respective top-knife beams 13 and 23 that they present a shed-like slant toward the centre of the cutter. The inner ends of the two top knives 16, 26 meet to ensure a continuous cut when both knives are in joint operation.

In the embodiment shown, the top-knife beams 13 and 23 are operated by pneumatic means. For this purpose, two cylinders 17 are provided on the beam 5, each cylinder containing a piston 18 slidably therein and having a piston rod 19 connected thereto. The lower end of each piston rod 19 is secured by means of a pin 42 in a flanged rod holder 20 and thereby to the top-knife beam 13 or 23, respectively. From a pressure medium source not shown, e.g. a compressed air pump, a pressure line 21 leads to a cutoff cock 22. From the latter, respective lines 25 connected thereto by a distributor member 24 lead to a three-way valves 27 respectively operated electromagnetically. Each of the two valves is connected to one of the cylinders 17 by a line 44 and to the atmosphere by an exhaust line 43.

The top-knife beams 13 and 23 are held in their lifted position or position of rest by spring power. For this purpose, as shown in Fig. 4, each of the two top-knife beams 13 and 23 is provided with two compression springs 28 acting against a spring bolt 29 and arranged in the beam 5. Each of the compression springs 28 is supported in the beam 5 in a spring cap 30. The spring bolts 29 which are firmly secured to the top-knife beams 13 and 23 in a spring bolt holder 45 by means of the pins 46 indicated, are provided at their upper ends, having a screw-thread 31, with a nut 32 and a lock-nut 33 serving to adjust the spring tension. Thus the springs 28 maintain the top-knives in their position of rest.

It is possible, however, to use any other suitable means for operating, i.e. lowering and lifting, the top-knife beams 13 and 23.

Further, each of the two top-knife beams 13 and 23 is provided with a holder 37 having a bore 38 extending horizontally therethrough, the bores 38 coinciding when the two top-knife beams 13 and 23 are in their respective lifted positions. A locking bar 39 may be inserted into the two bores 38 to mechanically interlock the two top-knife beams 13 and 23, or withdrawn manually from the bore 38 of either holder 37, as shown in Fig. 1, thus permitting to operate either of the two top-knife beams 13 and 23 independently of the other. Instead of effecting connection and disconnection of the upper beams manually means in the form of a piston and cylinder arrangement may be provided to operate locking bar 38 mechanically.

Fig. 3 shows in a side view a table 47 attached to the stands 1 and 2 and designed to receive the veneer strips 49 to be cut.

The arrow 48 indicates the direction of movement of the strip 49, indicated in dash-dotted lines, relative to the table 47 and to the cutter.

The control system of the veneer cutter is shown by

way of example in the diagram of Fig. 7 and consists essentially of the two electromagnetic three-way valves 27 described above and operated via the micro-relays 50, 51, 52 and 53, and of the two push-button release switches 54 and 55, and the cut-release lever switches 56 and 57 actuated by the stock 49 and connected in parallel with said push-button release switches 54 and 55. For the automatic reversal of the valves 27 and thereby for the return of the top-knife beams 13 and 23 operated by the compression springs 28 there are provided two limit switches 58 and 59 which open the electric circuit via the micro-relays 51 and 53 of the magnet valves 27, with the result that the latter return to their initial position and thereby shut off the supply of compressed air from the line 25 to the cylinders 17 and concurrently open the exhaust line 43, thus permitting the air to escape from the cylinders 17.

Electrical current is supplied to the control system from an alternating current source not shown via a master switch 62, a transformer 61 and a rectifier 60, the rectifier 60 supplying direct current required for the electric control system.

The master switch 62 is of the reversing type. At "0" position the circuit is open and no current is supplied to the control elements, at "I" position the current source is so connected to the control elements that each of the two top-knife beams 13 and 23 can be operated individually via the micro-relays 50, 51 and 52, 53 respectively, and at "II" position the two cut-release switches 54, 55 and 56, 57 respectively are interlocked via the switch contact 63 so that the top-knife beams 13 and 23 simultaneously perform the cutting motion when one of the four release switches is tripped.

The micro-relays 50 and 52 are provided with self-holding or rest contacts 64, thus ensuring an impulse release of the cutting motion. The micro-relays 51 and 53 are equally provided with self-holding contacts 65 and are electrically interlocked with the micro-relays 50 and 52 in such a manner that only one cut release occurs when the cut-release switches 54, 55 or 56, 57 are operated, even if these remain closed beyond the period of the cutting cycle. The succeeding cut cannot be released before the respective release switch has opened after the preceding cut, i.e. before the associated control relays 50, 51 or 52, 53 have returned to their initial position.

Notwithstanding this, the cutter may also be controlled by mechanical, electro-mechanical, or high frequency means.

The mode of operation of the veneer cutter described hereinabove is as follows:

If veneer strips engaging both upper knives and requiring the entire width of the cutter are to be cut, the locking bar 39 is inserted into the bores 38 of the two holders 37, as previously mentioned, and secured in this position by means not shown in the drawings.

The pressure-medium cutoff cock 22 is opened, thus permitting the pressure medium to flow through the line 25 and the distributor 24 to the two electromagnetic three-way valves 27.

The master switch 62 is set to "II" position, with the result that the cut-release switches 54, 55, 56 and 57 are interlocked.

To operate the cutter, it is necessary to close the control circuit via one of the cut-release switches 54, 55, 56 or 57 and thereby energize the two magnets of the three-way valves 27, thus opening the valve passage between the line 24, 25 and the line 44 to the cylinders 17 and permitting the pressure medium to flow into the two cylinders 17, with the result that the two knife beams 13 and 23 with the top knives 16 and 26 move down and perform the cut in cooperation with the lower knife 7. Upon reaching their bottom position, the top-knife beams 13 and 23 actuate the limit switches 58 and 59 which in turn cut off the electric current to the three-way valves 27 via the micro-relays 51 and 53, so that said valves 27

revert to their initial position and thereby shut off the pressure medium line to the cylinders 17 and concurrently connect the two cylinders through the line 43 with the atmosphere. When the cylinders 17 become pressureless, the two top-knife beams 13 and 23 are lifted again by the action of the compression springs 28, whereupon the cutter is ready for the next cut.

If veneer strips less than half as wide as the maximum cutting width of the cutter are to be cut, the procedure is as follows:

The locking bar 39 is withdrawn from the bore 38 of one of the holders 37 and secured from falling out of the other holder 37 by means not shown in the drawing.

Now the master switch 62 is set to the "I" position, so that the cut-release switches 54, 56 and 55, 57 can operate as separate groups for the two top-knife beams 13 and 23, respectively.

Thus, it is possible to actuate the three-way magnet valve 27 for the top-knife beam 13 and thereby operate the top knife 16 by means of the cut-release switches 54 and 56, and also to actuate the three-way magnet valve 27 for the top-knife beam 23 and thereby operate the top knife 26 by means of the cut-release switches 55 and 57. The two knives 16 and 26 can be operated either simultaneously or successively, as required, by means of the associated cut-release switches 54, 56 and 55, 57 respectively.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A cutter for web type structures comprising a frame having a lower beam extending substantially horizontally with respect to said frame and being rigidly supported thereby, a pressure beam rigidly connected with said frame and extending parallel to and above said lower beam, a lower cutting knife supported on said lower beam and having an upwardly directed cutting edge, downwardly extending guide means supported by said pressure beam, a plurality of upper beams intermediate said pressure beam and said lower cutting knife and arranged for upward and downward movement along said guide means independently of each other, said upper beams extending in a common vertical plane with said lower beam, locking means connected to said upper beams for selectively effecting interconnection and disconnection of said upper beams with each other, respectively upper cutting knives for each of said upper beams and connected to the latter, said upper cutting knives having downwardly directed cutting edges for cooperation with the cutting edge of said lower cutting knife, the adjacent ends of said upper cutting knives meeting to present a continuous edge, the sum of the length of said cutting edges of said upper knives corresponding substantially to the length of said cutting edge of said lower knife, and respective actuating means for said upper knives operatively connected with said upper beams to move said upper cutting knives with said cutting edges thereof into and out of cooperation with said cutting edge upon operation of said actuating means, independently of each other, to thereby permit cutting a plurality of strips of said web type structure, each of said actuating means including a piston and a cylinder.

2. The cutter according to claim 1, wherein said locking means include holders fixed to said upper beams, said holders having bores therethrough, a locking bar extending through said bars for holding said upper beams together, and means for actuating said locking bar connected thereto.

3. The cutter according to claim 1, wherein respective control means are provided for each of said actuating means.

4. The cutter according to claim 1, wherein respective

control means are provided for each of said actuating means, and further control means provided to effect simultaneous actuation of said actuating means when said beams are interconnected by said locking means.

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