

Sept. 3, 1946.

C. C. FRAME

2,407,070

CORE SPLICER

Filed March 4, 1942

3 Sheets-Sheet 1

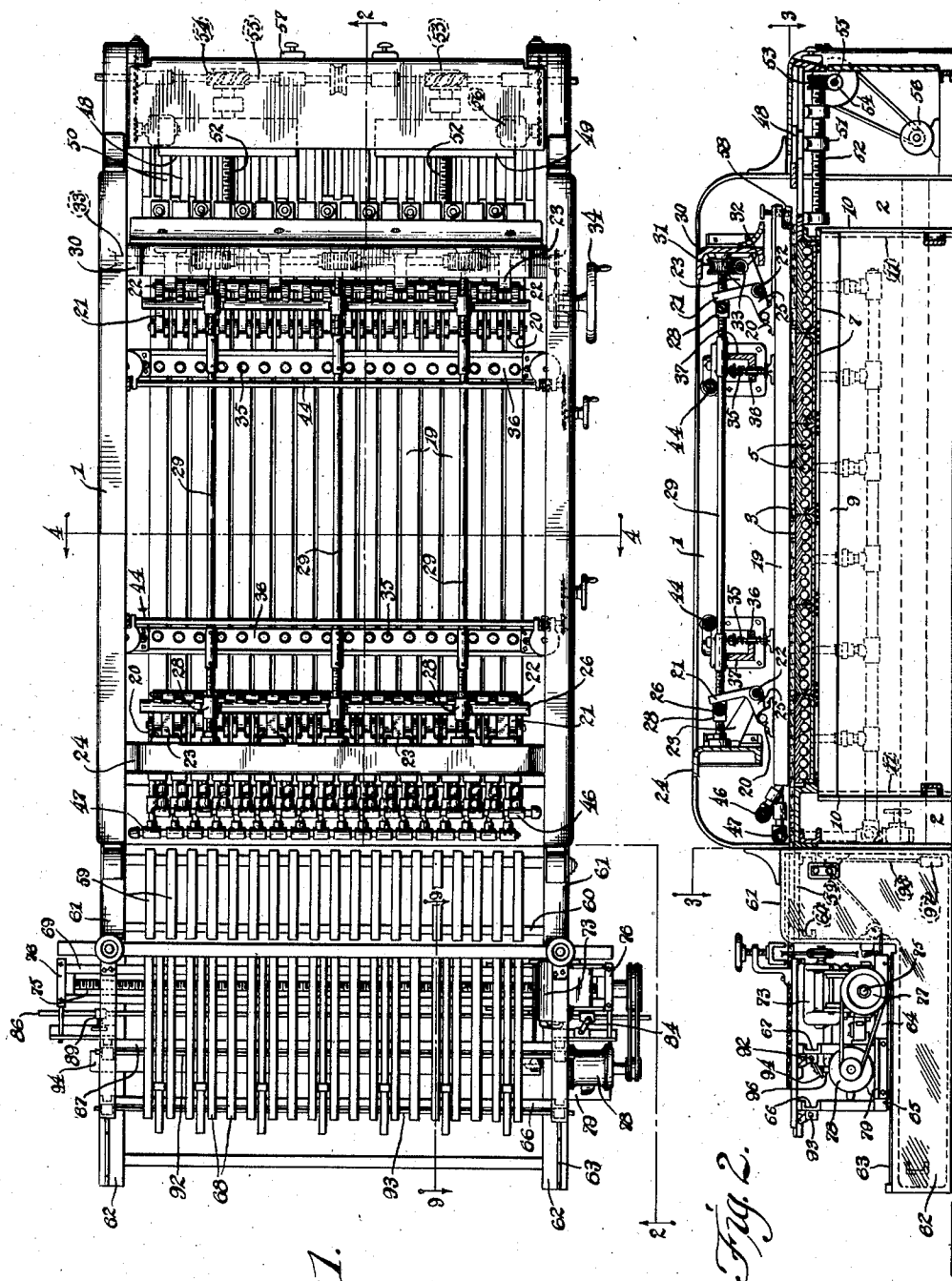


Fig. 1.

Fig. 2.

INVENTOR.
CLIFTON C. FRAME
BY: *Hood & Waker*
ATTORNEYS

Sept. 3, 1946.

C. C. FRAME

2,407,070

CORE SPLICER

Filed March 4, 1942

3 Sheets-Sheet 2

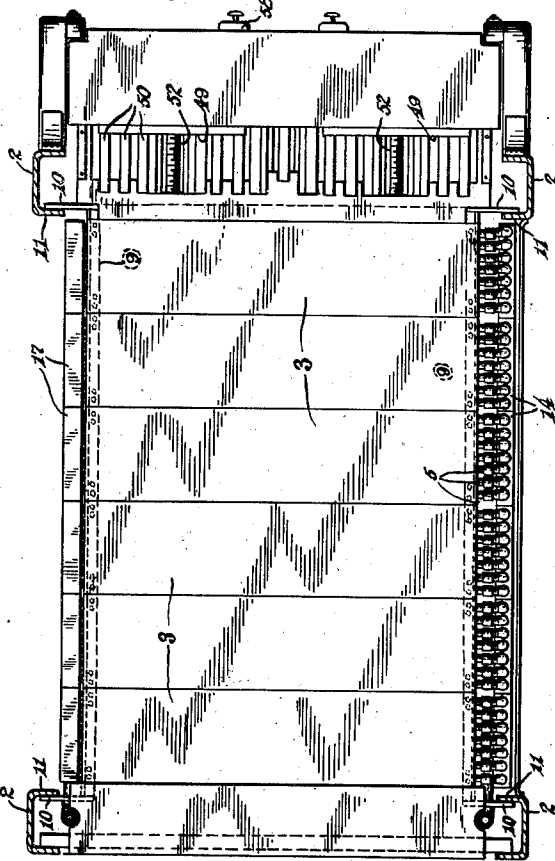
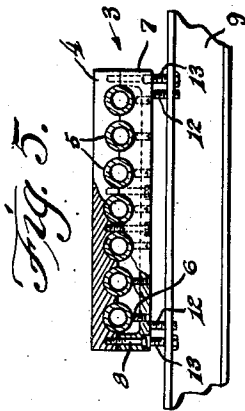


Fig. 3.

Fig. 8.

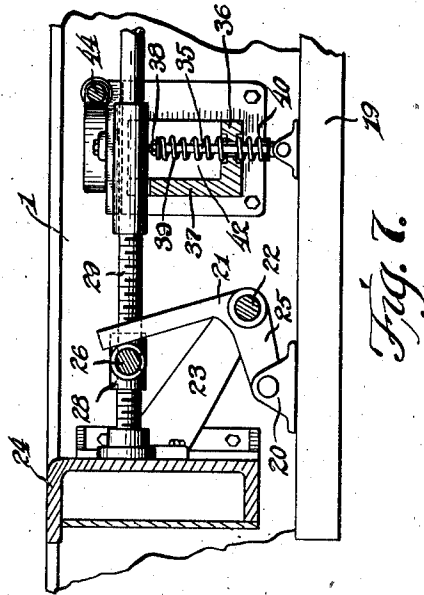


Fig. 7.

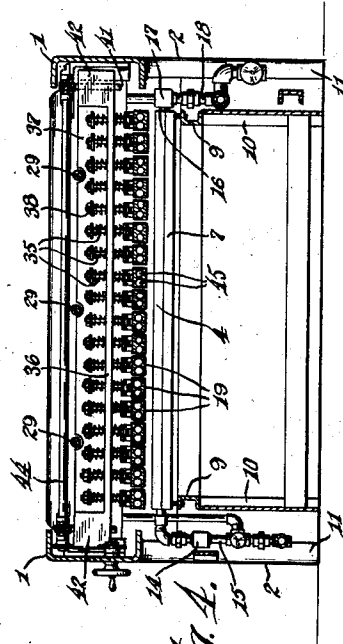


Fig. 4.

INVENTOR.
CLIFTON C. FRAME,
BY: *Good & Hahn*
ATTORNEYS.

Sept. 3, 1946.

C. C. FRAME

2,407,070

CORE SPLICER

Filed March 4, 1942

3 Sheets-Sheet 3

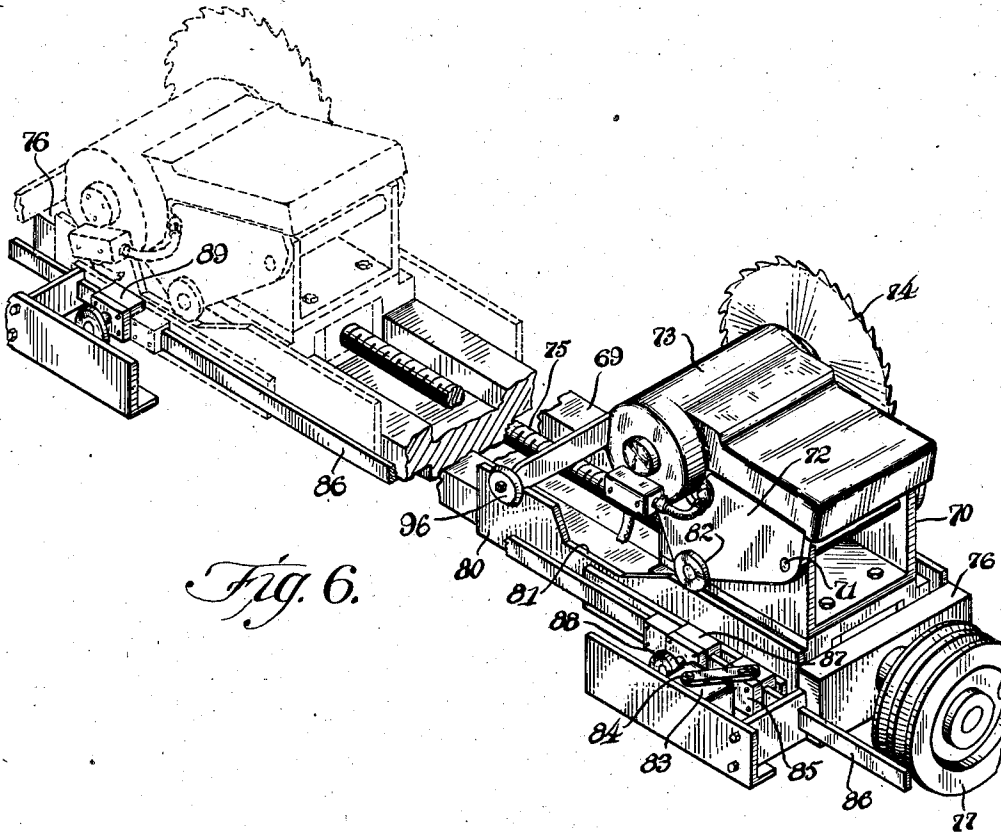


Fig. 6.

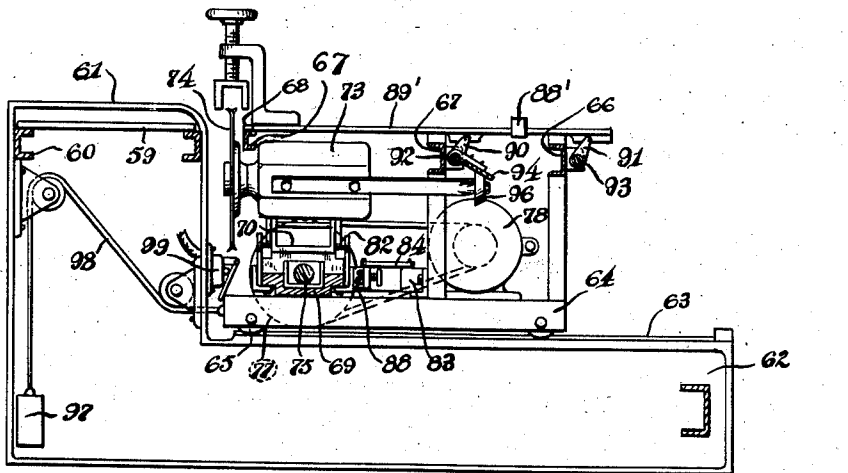


Fig. 9.

INVENTOR.
CLIFTON C. FRAME,
BY: *Wood & Hahn*
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,407,070

CORE SPLICER

Clifton C. Frame, Wabash, Ind., assignor to The
G. M. Diehl Machine Works, Wabash, Ind., a
corporation of Indiana

Application March 4, 1942, Serial No. 433,246

4 Claims. (Cl. 144-279)

1

The present invention relates to improvements in machines for joining the edges of boards to produce a continuous ribbon from which panels of the desired size may be removed.

One of the objects of the invention is to provide means for successively feeding widths of board, to the edges of which an adhesive has been applied, under pressure and heat. The arrangement is such that, due to the pressure applied to the boards as they are fed through the machine, sufficient resistance is imposed thereon so that the successive boards which are fed to those boards under pressure will have their edges forced together tightly and while held in this position, sufficient heat will be applied for causing the adhesive to set.

Another object of my invention is to provide a machine having the above characteristics in which means are provided for cutting the continuous ribbon of wood passing from the delivery end of the machine into panels of desired size and this automatically as the material is fed from the machine.

Further objects and advantages of the invention will appear more fully hereinafter in the accompanying specification and appended claims.

For the purpose of disclosing my invention, I have illustrated an embodiment thereof in the accompanying drawings, in which:

Fig. 1 is a plan view of my invention, with the various cover plates removed;

Fig. 2 is a longitudinal sectional view of my invention on the line 2, 2 of Fig. 1;

Fig. 3 is a sectional view on the line 3, 3 of Fig. 2;

Fig. 4 is a detail section on the line 4, 4 of Fig. 1;

Fig. 5 is a detail sectional view showing the support and heating means for the bottom heating plates;

Fig. 6 is a perspective view of the cut-off saw and its operating mechanism, showing it in its projected position in dotted lines;

Fig. 7 is an enlarged detailed view of the adjusting means for the presser bars;

Fig. 8 is a detail sectional view showing the means for varying the pressure of the top presser bars; and

Fig. 9 is a detail sectional view on the line 9, 9 of Fig. 1 showing the adjustable gauge stops.

In the embodiment of the invention illustrated, I provide a pair of side frames 1 having downwardly extending legs 2, 2 at each end. Each of these side frames is preferably in the form of

2

channel members to give sufficient rigidity thereto without unnecessarily adding to the weight.

A bed is supported between these side members and comprises a plurality of sections 3. Each section extends transversely between the end frames and each section comprises a top plate 4 having on its bottom face arcuate recesses for receiving heating pipes 5 which pipes are held in intimate contact with the walls of their recesses through the medium of adjusting screws 6 extending through the hollow bottom section 7. This bottom section is secured to the top section 4 by screws 8 extending through the bottom section and into the top section. By means of the adjusting screws 6, the heating pipes 5 may be adjustably held in intimate contact with the walls of the grooves of the section 4. Each of these sections is vertically adjustably supported on longitudinally extending side channels 9 which extend the length of the frame and are secured at their ends to inwardly projecting plates 10 in turn secured, by welding or otherwise, to one of the intumed flanges 11 of each of the channel legs 2. The opposite ends of the bed sections are supported on vertically adjusting screws 12 extending through the top legs of the channels 9 and each of the bed sections is held against vertical displacement after having once been set, by means of hold-down bolts 13 screwing into the bottom members of each section and extending through the top flange of the supporting U-channels 9. By this arrangement, each of the bed sections may be vertically adjusted and maintained in said vertically adjusted position as well as being held against longitudinal or lateral displacement. Thus, each of the sections may be closely adjusted relatively to the other one to prevent irregularities in the top surface of the bed. Due to the fact that the bed is made up of a plurality of sections 3, which sections may be individually removed from the machine for the purpose of repair and so forth and which sections, when assembled in the machine, must present a smooth continuous bed, I provided the above described means for vertically adjusting the sections.

The pipes 5 are each connected with a supply header 14 in turn connected with supply pipes 15 and at their opposite ends with return connections 16 extending to headers 17 in turn connected with return pipes 18. This permits the circulation of live steam through the pipes for maintaining the bed sections properly heated.

Mounted above the bed is a plurality of presser heaters. Each one of these heaters comprises a

longitudinally disposed hollow presser bar 19 preferably rectangular in cross section and made hollow to receive suitable heating pipes. Each of these presser bars, at its opposite ends, has welded or otherwise secured thereto upwardly extending lugs 20 and for vertically adjustably supporting each end of the presser bars, I provide, at each end, a bell crank lever 21. This lever is pivoted at 22 to a cross rod supported between arms 23 extending inwardly from a cross channel 24 secured between the side members 1. One leg 25 of the bell crank lever is pivoted to a lug 20 on the pressure bar. The opposite leg, at its upper end, bears upon a longitudinally adjustable cross member 26. The cross member is provided with nuts 28 through which are threaded adjusting rods 29. The rods 29 are rotatably supported at one end in the cross channel 24. A similar cross channel 30 supports the opposite ends of the rods. Each of the rods or shafts 29 is provided with a worm gear 31 meshing with a worm 32 on a cross shaft 33 driven by a hand wheel 34. Due to this construction, the height of each of the pressure bars 19 relative to the bed may be accurately adjusted. At the same time, each of the presser bars can move upwardly to adjust itself to irregularities or variations in the thickness of the boards fed beneath the same. The bars 19 are maintained in a floating position and biased downwardly through the medium of pivoted posts 35 secured, at each end of the presser bars 19. The parts at each end extend through the horizontal leg 36 of an L-cross-beam 37 supported between two side members 1. Interposed between a nut 38 on the top of this post and the leg 36 is a coil spring 39 which resiliently supports the bar and a coiled spring 40 between the under face of the leg 36 and the bar biases the same in a downward direction. Therefore, it is biased normally in its downward direction under the influence of the spring 40 with sufficient pressure to bear upon the tops of the boards fed therethrough and, at the same time, can move upwardly to accommodate any irregularities in the board. In some instances, the springs 40 may be dispensed with and the weight of the bars alone be depended upon to provide the pressure. In order to maintain the pressure of the bars 19 constant, irrespective of their vertical adjustment, or in order to modify the pressure of the bars, the cross beams 37 are vertically adjustable by means of screws 41 supported from the side frames 1 and extending through nuts 42 at the ends of the beams. Each screw is provided with a worm wheel 43 driven from worms on shafts 44. There is one shaft for each of the cross beams so that while each cross beam may be adjusted separately, the two ends of each beam are adjusted simultaneously.

Each of the pressure bars 19, as before stated, is made hollow and passing through the presser bars are suitable heating pipes 45 arranged in pairs and extending the full length of the bars to provide inlet and return steam conduits. The ends of these pipes are connected by swivel joints with suitable supply headers 46 and return headers 47 so that the presser bars 19 may, during the operation of the machine, be maintained heated to the desired temperature.

The material is fed to the heating and pressing mechanism, above described, through the medium of a pair of reciprocating rams 48 and 49 which reciprocate above guide bars 50 disposed at the inlet end of the machine. These reciprocating rams are separately driven so that either

may be used alone or the two may be driven simultaneously. To this end, each of the rams is provided with a downwardly extending lug 51 constituting a feeding nut through which extends a feeding screw 52, having at its forward end a worm gear 53 driven from a worm 54 on a shaft 55, extending transversely of the machine, which shaft is driven by a suitable chain or belt drive from a motor 56. Each motor is provided with a suitable reversing switch, as at 57, within easy access of the operator, so that when the board is completely fed into the machine, the operator may, by the control of the switch, reverse the drive of the motor to retract the ram to receive another board. If desired, of course, an automatic reversing switch can be provided for automatically driving the motors forward and reverse a sufficient time to give a complete forward and reverse stroke to each of the rams 48 and 49 at the receiving end. Each of the presser bars 19 is provided with a hinged lip 58 biased downwardly to exert just a little additional pressure on the board as the same is received beneath the presser bar.

In the operating of so much of the machine as has been described, the initial board is fed beneath the presser bars 19 through the medium of the rams 48 and 49 and after the rams have been retracted, the next succeeding board is dropped in front of the ram with its front edge containing an adhesive. This board is then pushed forward against the initial board which has been partially fed into the machine and as it is pushed forward, an intimate joint is made between the rear edge of the initial board and the forward edge of the inserted board. The pressure of the presser bars 19 is sufficient to provide considerable resistance to the movement of the boards through the machine and, therefore, considerable edge to edge pressure is exerted by the feeding of the boards therethrough. In this way, the boards are maintained in intimate joint association and, at the same time, subjected to the heating effect from the stem pipes of the bed and pressure bars so that by the time the boards pass out from the delivery end of the machine, the glue joints have been firmly set. It is thus seen that so long as the boards are fed into the machine at the front end, a continuous ribbon of jointed boards or a continuous ribbon of material is fed out of the rear end of the machine.

On the outfeed side of the apparatus, I provide an outfeed table which consists of a plurality of spaced apart parallel supporting rails 59 supported on transversely extending beams 60 mounted between the two end members 61 secured to or forming a part of the rear legs 1. In order to cut the ribbon into desired lengths, I provide a travelling saw which travels longitudinally with the forward movement of the ribbon and also travels transversely to make its cut. To this end, the two side members 61 are provided with rearwardly extending rails 62 on the top of each of which is provided a track 63. Travelling on these tracks is a supporting frame comprising the two bottom members 64 having rollers 65 riding on the tracks, and a pair of transversely extending cross frames 66 and 67. These cross frames, on their tops, support longitudinally extending parallel separate rails 68 which are coincident with the rails 59. The cut-off saw is mounted to move transversely on a guide rail member 69 which extends between the two side rails 62. Mounted to slide on this guide rail member 69 is a supporting U-shaped frame

70 on which is pivotally supported, as at 71, the saw supporting frame 72 carrying at its forward end an electric motor 73.

The frame 70 is moved transversely of the ribbon of material through the medium of a driving screw 75 operating between the rails 62 and jour-
nalled at the opposite end in cross blocks 76 se-
cured on the end of the rail member. This screw
75 is provided with a driving pulley 77 which is
driven from a suitable driving motor 78 mount-
ed on a platform 79 carried by one of the two
side members 64.

The saw is maintained in its raised or cutting position as it travels from the near side, looking at the drawings, to the far side of the glued ribbon, through the medium of a slide block 80 which moves with the frame 70 but has a limited movement relatively thereto. This slide block is provided with a notch 81 in its upper face and a roller 82 rides on the upper face or upper edge of the slide block. As the frame 70 and its associated saw travels in a cutting direction, the roller 82 will ride on the raised portion of the slide block 80. However, as the saw unit approaches the opposite side of the wood ribbon, the slide block 80 will impinge upon the opposite end cross block 76 and be held stationary, although the saw continues to move for a short distance or until the roller 82 has dropped into the notch 81. By the time that the roller has dropped into the notch 81, thereby lowering the saw 74 below a cutting position, the feed screw 75 will have been reversed causing the saw carriage or frame 70 to travel in a reverse or return direction, the saw, however, remaining in its lowered position so that it will clear the stock. When the saw carriage reaches the limit of its return movement, the block 80 will strike the opposite cross or end member 76 permitting the carriage to travel while the block remains stationary. Accordingly, the roller 82 will ride up on the track until the saw is again in its elevated and cutting position.

The forward and reverse drive of the motor 78 which drives the screw 75 is controlled through the medium of a reversing switch 83 which is controlled by an operating arm 84. This arm is pivotally connected to a block 85 on a sliding rod 86. The rod 86 carries an adjustable stop block 87 which, in turn, is adapted to be struck by a striker block 88 carried by and movable with the frame 70. A similar stop block 89 is carried at the opposite end of the rod 86. As the frame 70 travels in a cutting direction, being driven by the screw 75, the striker block 88, travelling with the frame, will eventually strike the stop block 89 causing the stop block to move in the direction of travel of the saw frame 70 and thus moving the rod 86 to throw the switch 83 to reverse the direction of drive of the motor 78. Bearing in mind that the saw 74 has now dropped below the cutting level, the screw 75 will reverse the travel of the saw frame, bringing the same back to its initial position. As the saw frame returns to its initial position, the striker block 88 will strike the stop block 87, thus moving the rod 86 in its opposite direction and again reversing the drive of the motor, thus placing the motor 78 in a position to move the saw across the ribbon when the motor is again started.

The movement of the saw with the advance movement of the ribbon of material as the material is fed out of the machine is imparted through the medium of adjustable stops 88' which are mounted on rails 89' disposed between

the rails 68 and secured at their forward ends to the cross members 67 of the frame 64. These rails 89' are supported on pivoted arms 90 and 91 mounted on cross rods 92 and 93 supported in the travelling frame and the arms 90 and 91 are adapted to rotate for the purpose of dropping the rails 89' below the level of the rails 68. The rails 89', however, are maintained in their raised position through the medium of a cross bar 94 which is secured to the rod 92 and which rests on a roller 96 carried on the motor 73. Thus, as long as the saw is in its elevated or cutting position, the rails 89' will be in their raised position with the stops 88' in a plane to be engaged by the material as it is fed out of the machine. Therefore, as the material is fed out of the machine, the entire saw carrying frame mechanism will be advanced with the material and during the cutting movement of the saw. Due to the engagement of the material with the stops 88', as the material is fed forward, the carriage 64 will likewise be fed forward. As soon, however, as the saw has completed its cutting movement, as heretofore described, it will be dropped below the cutting level and with the dropping of the saw below the cutting level, the arms 90 and 91 will be permitted to swing, lowering the rails 89' and accordingly lowering the stops 88' to permit the cut off material to pass off the machine and, due to the fact that the next succeeding edge of the material has not struck the stops 88', the frame can return to its initial position under the influence of the weight 97 connected with the frame through the medium of a cable 98 which weight is raised by the movement of the frame 64 and thus biases the frame in its retracted position. As soon as the frame returns to its initial position, the starting and stopping switch 99 will be struck by the frame opening the circuit of the motor 78 and thus causing the drive of the screw 75 to stop. As soon, however, as the edge of the feeding ribbon strikes the stops 88', which have been raised with the raising of the frame 72 and the frame commences to move the material, the switch 99 will move to closed position, starting the motor 76 causing the saw to move across the material for cutting purpose.

It is to be noted that the motor 73 for driving the saw 74 is separate from the motor for driving the saw feed and during the operation of the machine, as long as it is desired to cut off panels of the desired length, the saw 74 can be run continuously. Any suitable switch mechanism, hand operated, may be used for starting and stopping the saw 74.

It is obvious that the stops 88' may be adjusted to any desired position and, therefore, the length of the panel to be cut off may be changed to meet the requirements. Furthermore, it is obvious that as long as material is being fed out of the machine, the same length of panel will be cut off by the saw automatically.

I claim as my invention:

1. In an apparatus of the character described, in combination, a flat bed comprising a plurality of flat horizontally disposed bed plates arranged closely adjacent one another and forming a substantially continuous flat bed extending from side to side, heating elements in contact with and heating said plates, a plurality of longitudinally disposed presser bars vertically movable independently of one another, means for heating said bars, means for resiliently biasing said bars toward the bed and reciprocating means for successively feeding boards be-

7

neath said presser bars, said presser bars and bed forming resilient clamping means for the boards fed therebetween to offer resistance to the movement of the boards therethrough whereby, as each board is fed to the machine, it will be forced against the preceding board to insure a tight junction between the edges of the adjacent boards.

2. In an apparatus of the character described, in combination, a flat bed comprising a plurality of flat horizontally disposed bed plates arranged closely adjacent one another and form a substantially continuous bed extending from side to side and independently vertically adjustable, means for heating said plates, a plurality of longitudinally disposed presser bars vertically movable independently of one another, means for resiliently biasing said bars toward said bed plates, means for heating said bars and reciprocating means for successively feeding boards between said plates and bars, said plates and bars providing clamping means for maintaining the boards in position and offering resistance to the movement of the boards thereto whereby as each board is fed into the machine, it will be forced by the feeding means into close edge-to-edge abutment against the preceding board.

3. In an apparatus of the character described, in combination, a flat bed comprising a plurality

8

of flat longitudinally disposed bed plates arranged closely adjacent one another forming a continuous bed extending from side to side and vertically adjustable independently of one another, means for heating said plates, a plurality of longitudinally disposed presser bars vertically movable independently of one another, means for biasing said bars toward said bed, heating means for said bars, means for simultaneously vertically adjusting said bars relatively to said bed and reciprocating means for successively feeding boards between said bars and plates.

4. In an apparatus of the character described, in combination, a flat bed, a plurality of flat horizontally disposed bed plates arranged closely adjacent one another forming a continuous bed extending from side to side and vertically adjustable independently of one another, means for heating said plates, a plurality of horizontally disposed presser bars disposed above said plates, means for biasing said bars toward said plates, means for heating said bars, means for simultaneously vertically adjusting said bars relatively to said plates and so connected with said bars as to permit the vertical movement thereof, and reciprocating means for successively feeding boards between said bars and plates.

CLIFTON C. FRAME.