

Dec. 30, 1969

J. N. SCHMITT

3,487,430

ROOF TRUSS MACHINE

Filed April 22, 1968

3 Sheets-Sheet 1

FIG. 1

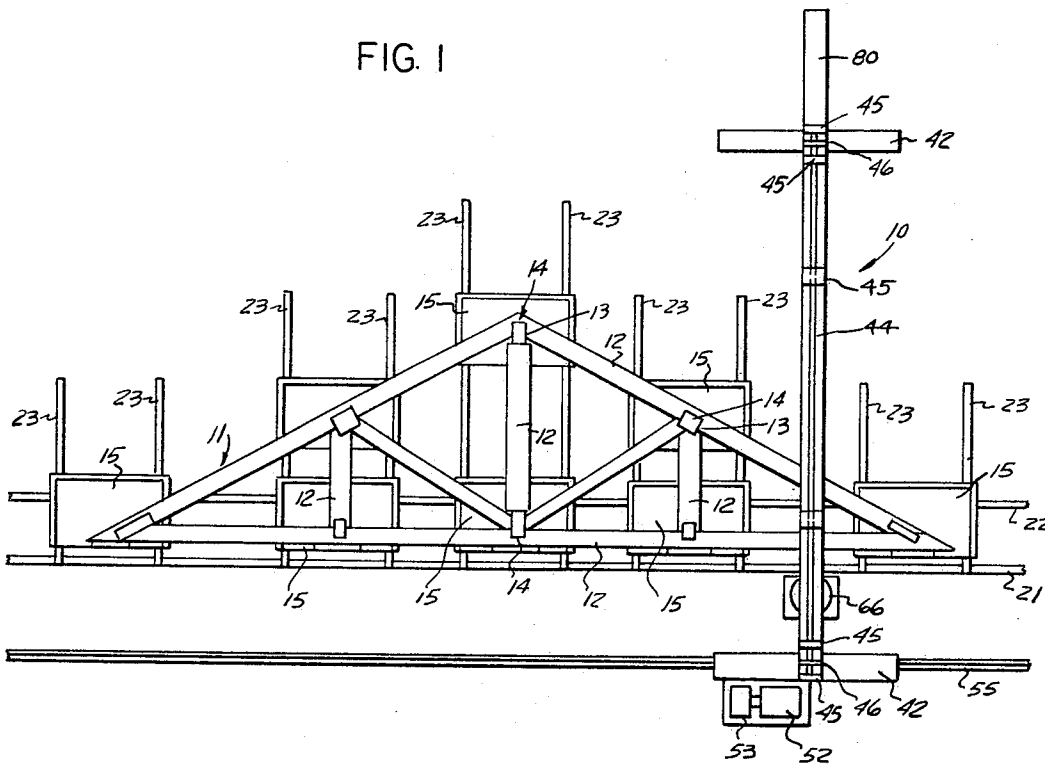
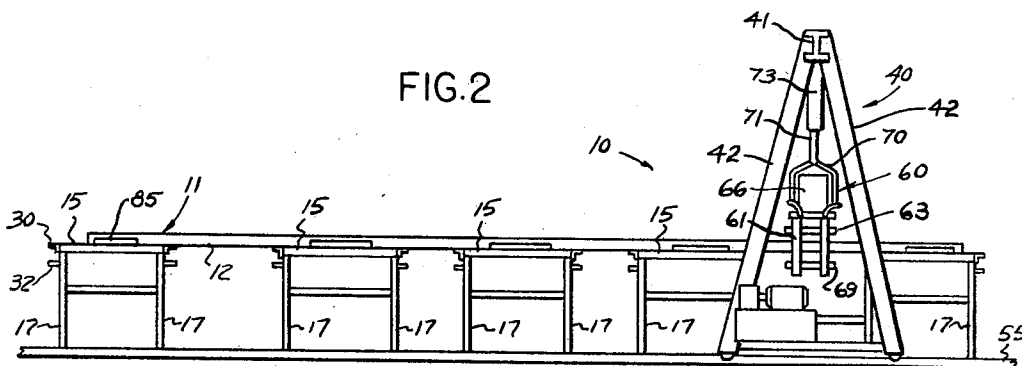


FIG. 2



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FIG. 3

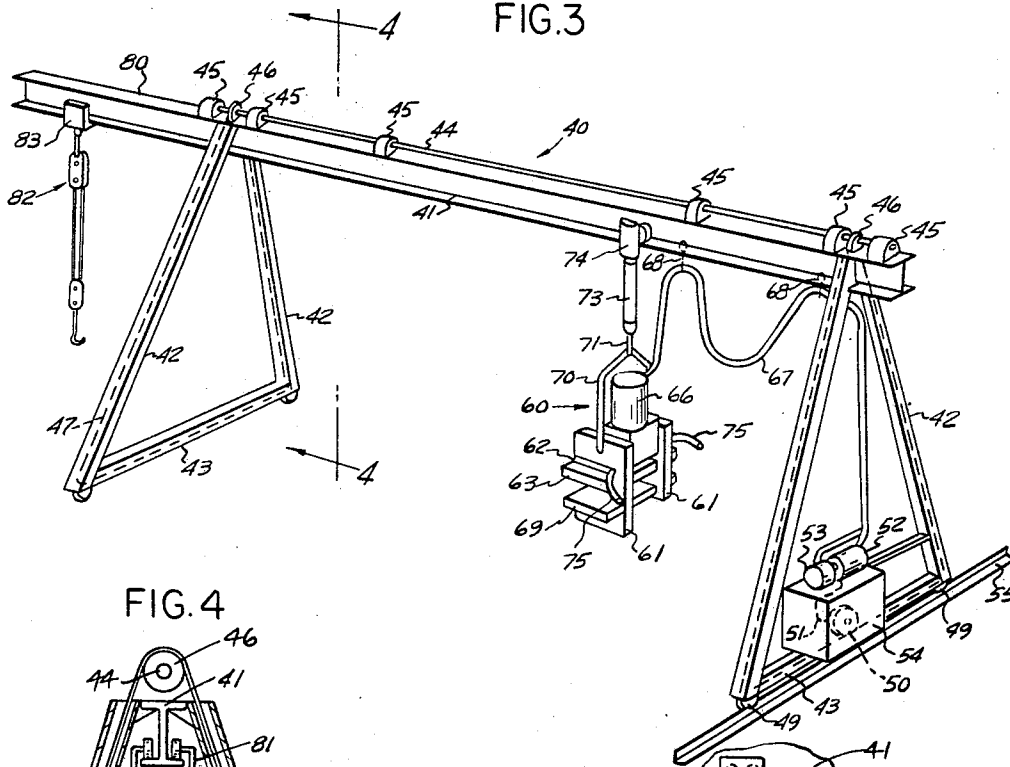


FIG. 4

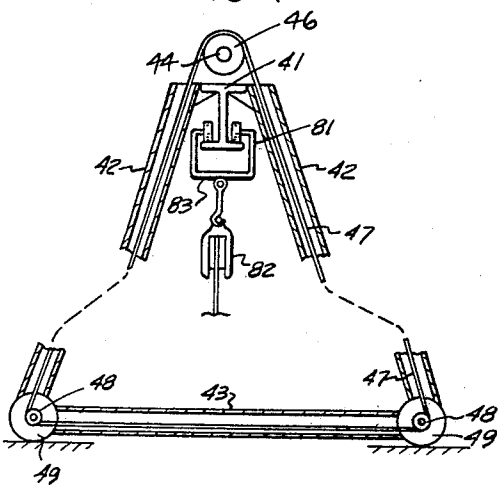


FIG. 5

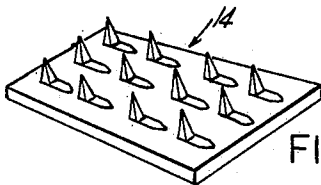
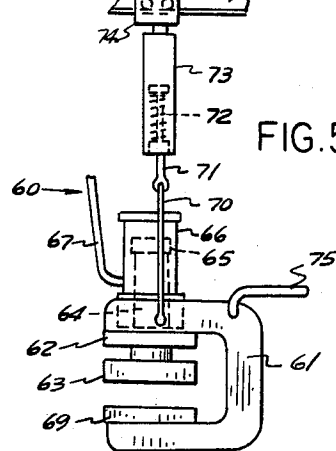


FIG. 6

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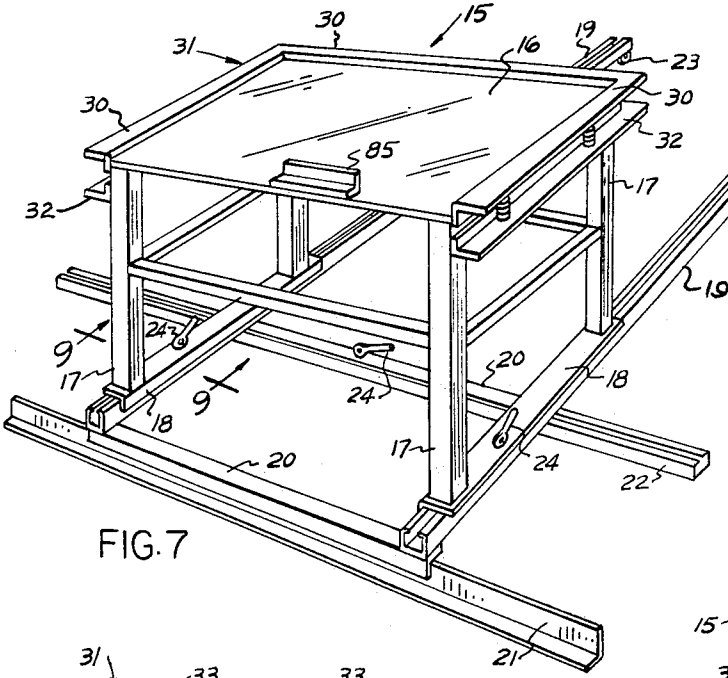


FIG. 7

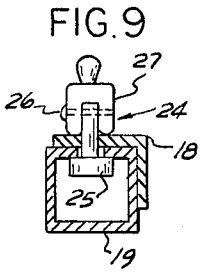


FIG. 9

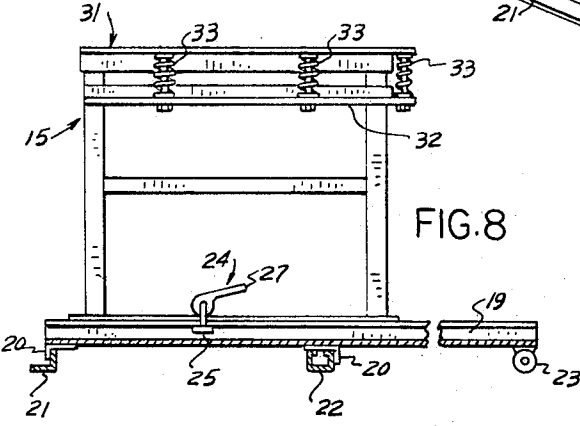


FIG. 8

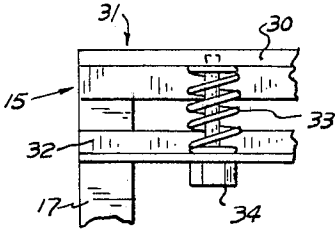


FIG. 10

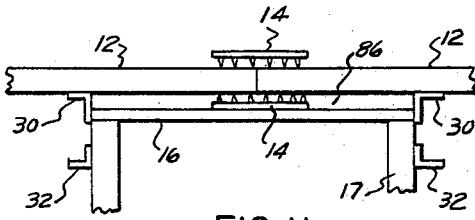


FIG. 11

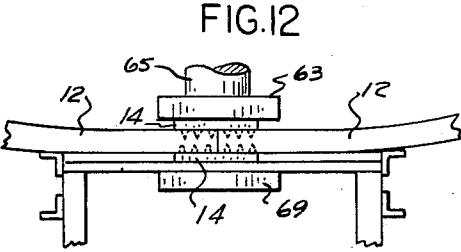


FIG. 12

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ROOF TRUSS MACHINE

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6 Claims

ABSTRACT OF THE DISCLOSURE

A machine for assembling wood frames, such as roof trusses made of wood elements abutted together and secured by spiked truss connector plates, which comprises a number of tables arranged in a row, each table having edge strips spring mounted adjacent to its edges for normally extending slightly above the table top and for supporting the wood elements to be joined together, wherein lower connector plates may be slipped into the gap between the table tops and wood elements. The tables are each slidably mounted upon primary tracks, in turn slidably mounted upon perpendicularly arranged floor tracks for aligning the tables in predetermined patterns. A gantry having a horizontal beam and wheeled support legs is arranged transversely of the row of tables and supports a vertical, C-clamp type press for movement along the beam. The wheels on one side of the gantry are guided upon a floor track arranged parallel to the table floor track and the wheels are power driven in synchronism. The press is applied to one table at a time and its jaws receive and squeeze against the table top, the connector plate, the wood elements and an upper connector plate, whereupon the wood elements, with the table edge strips move downwardly into alignment with their respective table tops during press operation.

BACKGROUND OF INVENTION

In the manufacture of wood roof trusses and similar wood frames, it is conventional to precut the various wood elements needed and then assemble them in abutting end to end relationship, securing them together at their joints with spiked metal connector plates. Various types of supports and press devices have been used for assembling the wood elements and the connector plates.

In the devices available the supports are relatively limited in their movability and thereby are limited in the types of trusses that can be made thereupon. In addition, particularly with the overhead supported types of press devices, heavy ceiling or roof beams have been required so that the machinery used invariably has required heavy roof construction.

Since it is conventional to use a spiked connector plate on both sides of each joint, assembly has normally been accomplished by abutting the wood members, locating a connector plate above and below the joint and then squeezing the two connector plates into the wood with the presses, usually of a C-clamp type of press. In the past, it has been considered important to maintain the wood elements steady while moving the plates downwardly and upwardly as the case may be, into the wood. This has necessitated some sort of suitable lower plate support which could be moved upwardly and downwardly for moving the plate correspondingly.

SUMMARY OF INVENTION

I have discovered that contrary to the past practices the wood elements can be moved, by bending, downwardly into the lower plate so that the lower plate can be kept steady, with the upper plate and wood elements moving downwardly, thereby permitting a simplified structural arrangement for supporting the wood elements

and plates and simplifying considerably the machine so that it can be used to make a variety of trusses and wood frame configurations.

Summarizing, my invention contemplates using a number of tables, each of which is movably supported in two directions so as to form a predetermined pattern, with the tables having movable edge frames or strips for supporting the wood elements above the table tops, to provide a gap for insertion of lower connector plates. The C-shaped clamp press used here is supported by a traveling or moving gantry which is power driven and guided on a track so that its press may be arranged at each of the tables, as required, and wherein the press operates to squeeze, by bending, the wood elements downwardly towards the table, thereby pushing the wood towards the lower connector plate, rather than vice versa while simultaneously applying the upper connector plate.

With this construction, the overhead roof construction conventionally used is completely eliminated and in fact, in many locations where the weather is warm, no roof at all is needed for the machine, the gantry serving to adequately support, for complete movability, the press. In addition, the table support construction is completely simplified and more movable because of the elimination of the need to steady the wood while moving the lower plate upwardly into it.

These and other objects and advantages of this invention will become apparent upon reading the following description of which the attached drawings form a part.

DESCRIPTION OF DRAWINGS

FIG. 1 is a top, plan view of the truss machine hereof.

FIG. 2 is a front elevational view of the machine of FIG. 1.

FIG. 3 is a perspective view of the gantry, and

FIG. 4 is a fragmentary, enlarged, cross-sectional view of one end of the gantry, taken in the direction of arrows 4—4 of FIG. 3.

FIG. 5 is an enlarged, elevational view of the C-clamp type press.

FIG. 6 is a perspective view of a typical spiked connector plate.

FIG. 7 is a perspective view of one of the tables and its supports.

FIG. 8 is a side elevational view of the table support.

FIG. 9 is an enlarged, fragmentary view taken in the direction of arrows 9—9 of FIG. 7, and

FIG. 10 is an enlarged fragmentary view of one corner of the table.

FIG. 11 is a front, elevational view of the upper portion of the table supporting wood elements with upper and lower connector plates prior to pressing.

FIG. 12 is a view similar to FIG. 11, but showing the press applying the squeezing pressure for assembling the connector plates into the wood elements for completing a joint.

DETAILED DESCRIPTION

FIGS. 1 and 2 illustrate the truss machine 10 used to make wood trusses or similar wood frames 11, made of a number of wood elements 12 which are precut and abutted end to end to form joints 13 interconnected by spiked, metal connector plates 14 (see FIG. 6 for example).

The machine comprises a number of support tables or pedestals 15, each of which (see FIG. 7) is formed with a flat top 16, legs 17, connected at their lower ends by angle iron connector strips 18 which in turn rest upon primary tracks 19. Each track 19 is approximately square-shaped in cross-section with an upper slot arranged along its length.

The primary tracks are interconnected by angle iron connectors 20 in turn rested upon a forward floor or secondary track 21 and a rear floor or secondary track

22, with the forward track being angle iron in cross-section and the rear track being square tubular shaped with an upper slot.

The various connectors and tracks are locked together by means of a suitable locking means 24, which may be in the form of a headed stud 25 (see FIG. 9) pivotally connected at 26 to a cam headed lock lever 27. Other similar and suitable fastening means may be used.

Angle shaped edge strips 30 are provided at at least three sides of the table to form a three-sided frame 31 whose upper surface is spaced slightly above the level or plane of the table top 16. Below the frame, angle flanges 32 are secured directly to the tables. Compression springs 33 guided by loose bolt type spacers 34 separate the frame 31 from the angle flange 32 to maintain it in its normal position. The spring mounting permits the frame 31 to be moved downwardly into the plane of the table, so as to be completely coplanar relative to the table or it may be tipped relative to the plane of the table.

Rollers 23 are provided on the rear end of the primary tracks 19. With this construction, the tables with their primary tracks may be moved along the floor or secondary tracks 21 and 22 and the tables may be moved perpendicularly thereto along their primary tracks, thereby permitting each of the tables to be set in a predetermined position to form a pattern wherein each table will support a number of element ends and particularly a single joint. In this manner, various shapes of trusses can be made such as the one illustrated in FIG. 1, or, by moving the tables, a scissors-type or step-type of truss.

Referring now to FIGS. 3-5, a gantry 40 is formed with an I-beam 41 which spans the row of tables transversely, and is supported by opposite pairs of legs 42 which form inverted V-shapes. These legs are hollow and are interconnected at their lower ends by lower connector tubes 43.

A drive shaft 44 supported by spaced bearings 45 extends along the top of the I-beam and is provided at its ends with chain sprockets 46. A chain 47 engages each of the sprockets and then extends downwardly through the triangle formed by its respective pair of legs 42 and connected tube 43. The chains each extend around lower sprockets 48 (see FIG. 4) to which are connected wheels or rollers 49 mounted upon the legs 42.

A suitable power mechanism shown schematically as a power driven sprocket 50 connected at 51 to a motor 52 drives one of the chains, in turn driving the drive shaft to thereby drive the opposite chain, thereby synchronizing all four rollers or wheels for synchronous movement.

The motor 52 drives a hydraulic pump 53 mounted upon a hydraulic drive reservoir 54 which also contains suitable controls for operating the drive mechanism for the rollers or wheels to thereby move the gantry as desired. One rail or track 55 is provided to guide one pair of the guide wheels, there being no need for another track on the opposite side because of the synchronous movement of all the wheels. The rail or track 55 is arranged parallel to the forward floor track 21 of the table support.

Suspended from the I-beam of the gantry is a C-clamp type of press 60 which is formed of a pair of C members 61 interconnected by an upper plate 62, with a movable upper platten 63 connected to a piston rod 64 whose piston 65 is arranged within a hydraulic cylinder 66. A suitable hydraulic line 67 connects the cylinder to the pump 53 with the line being intermittently supported by support trolleys 68 suspended from the I-beam.

A lower, immovable platten 69 is connected to the lower ends of the C members. An inverted U-shaped support frame 70 suspends the C members from a support rod 71, which extends through a coil spring 72 arranged within a support cylinder 73, in turn connected

to a roller type of support trolley 74 which rides upon the lower flanges of the I-beam.

Handle bars 75 on the press permit the operator to move the press as needed and direct it into its proper locations relative to the tables.

Preferably, control buttons are arranged in the handle bars for operating the press, as well as for operating the gantry to cause it to roll along the track 55, with the movement along the length of the beam being provided by manual movement. The controls used form no part of the invention herein, but any suitable, conventional controls may be applied. Hence, no further description thereof is included herein.

For more versatility, the I-beam is extended outwardly at one end to form an extension 80 and the legs are connected to the I-beam in such a way as to leave a space 81 between the lower flanges of the I-beam and the legs so that a conventional hoist 82, suspended from a roller trolley 83, may be guided upon the lower flange of the I-beam for picking up wood elements stacked along side the gantry and carrying these over to the support tables for setting up the truss elements initially.

To assist in locating the truss members, the tables may be provided with suitable angle shaped stops 85 (see FIG. 7) as needed.

OPERATION

In operation, the machine operators pick up the wood elements and lay them out upon the tables, after first prearranging and locking the tables in their predetermined patterns so that each table supports one joint. The wood elements are actually supported upon the edge strips 30 rather than upon the table tops so that a gap appears between the wood element and the table top. This gap 86 is shown in FIG. 11 and accommodates a lower spiked connector plate 14 arranged with its spikes upward. After the wood elements are all arranged, as shown for example in FIG. 1, the operators place the connector plates beneath and on top of each of the joints (see FIG. 11).

Thereafter, the press operator, by a combination of moving the gantry, as well as moving the press lengthwise of the gantry I-beam, positions the press at each of the tables so that the upper and lower platens receive the table top, the upper and lower connector plates and the wood elements.

As shown in FIG. 12, the operation of the press causes the wood elements and the upper connector plate to move downwardly against the table, whose top is immovable thereby forcing the wood downwardly against the lower connector. Momentarily, the wood, at its joints, flexes or bends slightly and at the same time, the squeezing pressure of the press causes the edge strips which had been supporting the strips until that point to move downwardly thereby more closely positioning the wood against the table top. In FIG. 12, the bending and the spacing of the wood is exaggerated to show the press operation.

Having fully described an operative embodiment of this invention, I now claim:

1. A roof truss machine comprising a row of a number of horizontally aligned tables having tops for supporting abutting wood elements to be formed into a truss frame type of construction;

a gantry having a horizontal beam, located above and transversely spanning the row of aligned tables, and a pair of support legs at each of the opposite ends of the beam, said legs forming inverted V's with their apexes secured to the beam and their lower portions supported upon wheels;

a drive shaft extending the length of the beam and having a drive sprocket located above each pair of legs, the sprocket and the pair of wheels of each pair of legs being interconnected by an endless chain, and means for driving one of said chains to thereby

drive its wheels as well as the shaft and the opposite pair of wheels;

a horizontal track aligned with the row of tables and one pair of said wheels being interconnected with said track for guiding the movement of the gantry, with the other wheels resting upon the floor upon which the machine is mounted;

a vertically movable press suspended from the beam by a roller support for movement along the length of the beam, said press being formed for horizontally receiving the tops of each table, one by one, and for vertically squeezing spiked truss plates laid upon the wood elements into said wood elements supported upon the table tops.

2. A truss machine as defined in claim 1, and said tables having peripheral frames, each frame extending slightly above its respective table top and being spring mounted for downward movement into alignment with its respective table top upon application of the press to the table top to squeeze the wood elements and table together, to thereby normally provide a gap between the wood elements and table tops within which spiked truss plates may be inserted for relative movement of their spikes upwardly into the bottom surfaces of the wood elements.

3. A truss machine as defined in claim 1, and said tables having support legs mounted upon primary tracks arranged perpendicular to the row, with the primary tracks being rested and guided upon floor tracks laid upon the floor parallel to the gantry track, whereby the tables with their primary tracks may be guided and moved along the floor tracks and the tables may be moved perpendicular to the floor tracks along their primary tracks; and locking means for fastening said tables in preselected positions.

4. A truss machine support table, comprising a horizontal top supported by two pairs of legs;

a peripheral edge frame closely surrounding at at least a portion of the edges of the top and normally arranged slightly above the plane of the top;

spring means securing the frame to the table, with the frame being downwardly movable against the force of the spring, into the plane of the table top;

with said edge frame being arranged to support wood elements, to be connected together, in a horizontal plane slightly above the table top to form a gap between the table top and the wood elements within which a spiked connector plate may be inserted so that downward pressure upon the wood elements forces the frame to move downwardly and drives the wood towards the table top to thereby embed the spiked plate into the wood elements;

each pair of said legs being slidably secured to a horizontally arranged primary track, in turn having one end slidably supported by a perpendicularly arranged floor track and its opposite end supported by a roller, wherein the table may be slid in one direction along the primary track and the table with the primary track may be slid in a perpendicular direction upon the floor track;

and locking means for fixing the table in preselected positions.

5. A truss machine for forming wood frames of wood elements abutted end to end and connected together at their joints by overlapping spiked connector plates, comprising a row of a number of aligned tables movably supported upon a floor with means for fixing the tables in preselected positions;

the tables having horizontally aligned table tops for supporting long wood elements at their respective joints with each wood element being supported by at least two tables;

said tables each having edge strips closely arranged along, but extending slightly above its respective edges, and spring means connecting the strips to the tables for downward movement of the strips, against the force of the springs, into horizontal alignment with their tables;

the wood elements normally being rested upon the edge strips to form a gap between each joint of the wood element and its respective table top, within which gap a spiked connector plate may be inserted, with the spikes pointed upwardly, and so that a second spiked connector plate may be loosely laid upon the top surface of the wood elements across their respective joints;

a vertical press movably supported for selective movement to each of the tables and arranged to receive and clamp between its press jaws a table top, upper and lower spiked plates and the wood elements at one joint thereof, wherein vertical movement of the press squeezes the upper plate into the wood elements and momentarily bends the wood elements downwardly towards the fixed table top for embedding the lower plate into the wood simultaneously.

6. A truss machine as defined in claim 5, and including a gantry comprising a horizontal beam traversing the row of tables and from which the press is movably suspended for movement in the direction of the beam;

the gantry having support legs with floor rollers for rolling the gantry along the length of the tables and for thereby positioning the press at any one table.

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U.S. Cl. X.R.

100—269; 227—152