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Schmitt

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[54] **APPARATUS AND METHOD FOR MAKING TRUSSES**

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[52] **U.S. Cl.** **100/41,** 100/173, 100/176, 100/DIG. 13, 227/152

[51] **Int. Cl.** **B30b 3/04**

[58] **Field of Search** ..... 227/152; 144/288 C; 269/321 F; 29/200 J; 100/DIG. 13, 35, 41, 144, 155 R, 173, 176

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[57] **ABSTRACT**

Fabricating wood trusses with toothed connector plate joints upon a two-truss position support plate which is endwise slidably supported upon a roller table having a roller press arranged transversely of the middle of the table. Pre-cut chords and web members are arranged at one side of the table and are loaded upon one plate position, with connector plates loosely positioned with their teeth down over the abutted joints and then the support plate is slid through the roller press to the other side of the table for press embedding the connector plate teeth into the members. Then the truss is turned upside down upon the second plate position and connector plates are arranged over the opposite faces of the joint, while simultaneously another truss is assembled upon the first plate position. Then the plate is returned through the roller press wherein the completed truss is then removed from the second position and the cycle is repeated. Thus, all loading of truss chord and web members are on one side of the table and on opposite sides of the press and all unloading of completed trusses is at opposite sides of the table and at opposite sides of the press.

7 Claims, 4 Drawing Figures

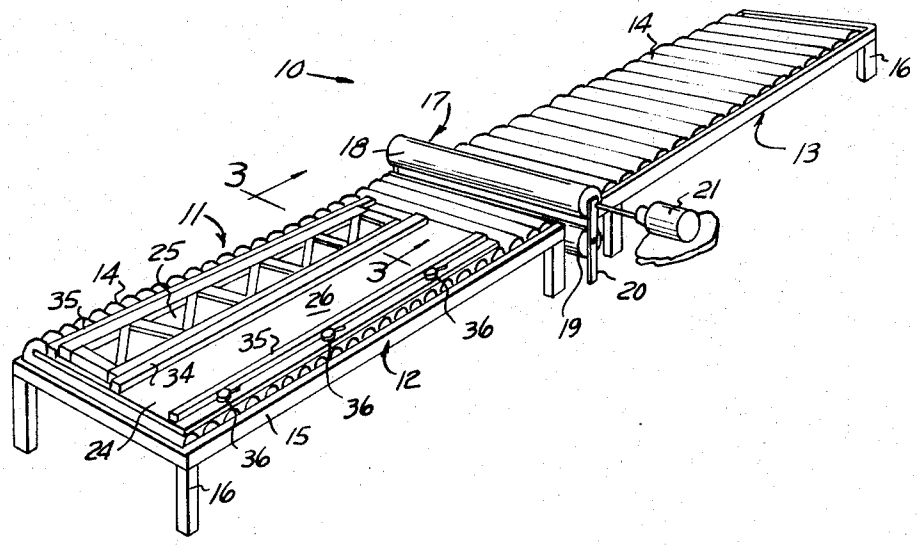


FIG. 1

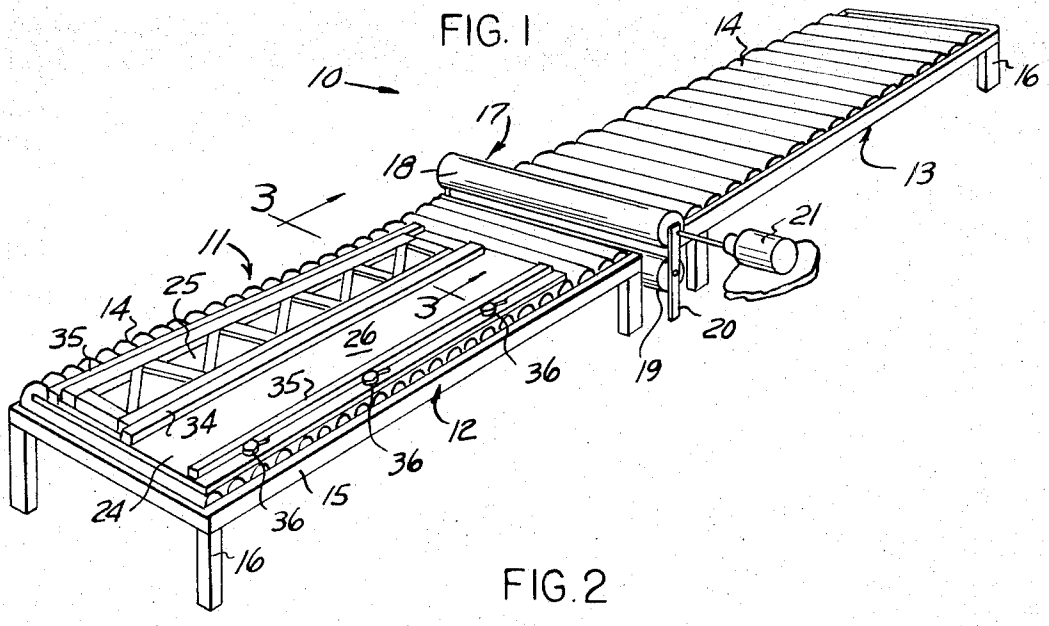


FIG. 2

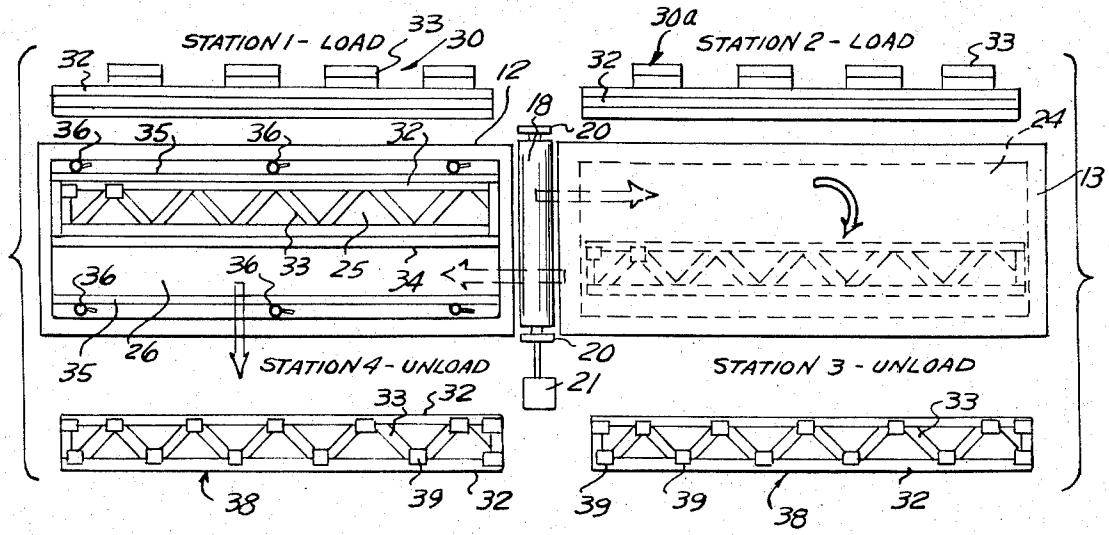


FIG. 3

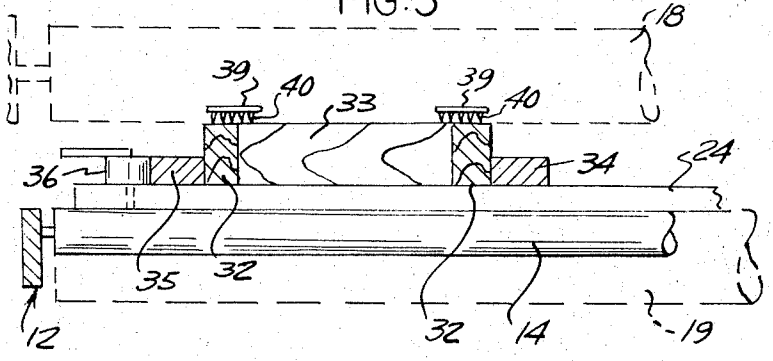
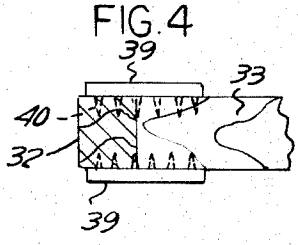


FIG. 4



APPARATUS AND METHOD FOR MAKING TRUSSES

BACKGROUND OF INVENTION

The apparatus and method herein relates to the fabrication of wood trusses, of various shapes and sizes, used as trusses or joists in building construction, such as for roof, deck and floor supports. Such trusses are made of elongated wood chord members which are interconnected by wood web members, with the chords and web members fastened together at abutted joints by means of toothed metal connector or fastener plates applied to the opposite faces of the joints with their teeth embedded in the wood. An example of this type of truss construction is disclosed in my U.S. Pat. No. 3,651,612 issued Mar. 28, 1972. An example of suitable connector or fastener plates is disclosed in my U.S. Pat. No. 3,633,454 granted Jan. 11, 1972.

The fabrication of such type trusses whether of the parallel chord joist type or the intersecting chord, V-shape roof truss type, requires considerable hand labor and considerable time in assembly and particularly in the embedding of the connector plates into the wood members. Thus, the invention herein relates to an improved system and apparatus for more rapidly and efficiently fabricating such trusses and particularly securing the connector plates thereto, which system employs relatively simple apparatus which reduces labor requirements considerably.

SUMMARY OF INVENTION

The invention herein comtemplates forming wood trusses upon a large metal support plate on which precut truss members are properly aligned and including loosely positioning connector plates over the joints upon one face of the assembled truss members, and then sliding the plate endwise upon a low friction support table through a roller type press to embed the connector plates and thereafter turning the partially assembled truss upside down, positioning connector plates upon the opposite joint faces and running the plate with the truss back through the truss for embedding plates into the opposite joint faces.

The support plate is of double truss width and at least as long as a single truss. Thus, four table positions are provided upon the apparatus, namely, (1) a first loading position where the truss members are assembled and clamped upon one side of the support plate and the connector plates are located upon the joints, (2) a second position at the opposite end of the table beyond the press from which second position the truss may be removed and turned upside down into (3) a third position on the opposite side of the support plate and table so that while plates are positioned manually over the opposite faces of the joints, another truss may be assembled upon the support plate at the second position, duplicating the operation of the first position, and thereafter, the plate may be run back through the press to the opposite end of the table where the now completed truss is removed from (4) the fourth position and the partially assembled truss at the first position is inverted and placed into the fourth position where the cycle is repeated.

With the foregoing system, several workmen located at one long side of the table are able to load truss members onto the support plate at either position one or position two and workmen located at the opposite side of the table can unload completed trusses as well as position connector plates over the inverted trusses to overlap the opposite faces of the joints. As can be seen, one long side of the table has two loading positions and the other long side has two unloading positions, with a press located between the opposite ends of the table for embedding the plates between the various positions.

The foregoing system and apparatus simplifies the handling of the raw materials, namely, the pre-cut chord and web members and also simplifies the removal of completed trusses, considerably reduces labor and handling in the fabrication and thus speeds up the fabrication of trusses as well as substantially reducing the costs thereof.

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

DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of the apparatus herein, with the support plate located at one end of the table and truss members loaded upon one side of the support plate.

FIG. 2 is a schematic plan view of the system and the various work stations thereof.

FIG. 3 is an enlarged, cross-sectional view taken generally in the direction of arrows 3—3 of FIG. 1.

FIG. 4 is an enlarged elevational view of one truss joint.

DETAILED DESCRIPTION

Referring to FIG. 1, the apparatus 10 is formed of an elongated, relatively narrow table 11 formed of two end to end arranged table halves 12 and 13 respectively. Preferably the tables are formed of a large number of rollers 14 arranged side by side and rollingly secured to and supported by a suitable frame 15 in turn supported above ground level by legs 16.

A roller press 17 is located at roughly the middle of the table 11 and consists of an upper roller 18 and a lower roller 19, each arranged transversely of the table, with one roller spaced apart a short distance above the other. The press rollers are supported by suitable support legs 20 which permit the rollers to rotate. Preferably, at least one of the rollers is motor driven by a suitable motor and connection 21 (shown schematically in FIGS. 1 and 2).

An elongated, flat support plate 24, preferably formed of a thin but relatively rigid sheet of metal is supported upon one of the halves of the table. The support plate is at least as long as the truss to be fabricated and double the width of such trusses. The support plate is divided into two elongated parts, namely, a load side or part 25 and an opposite unload side or part 26. Such plate may be made of a single sheet of suitable length and width or alternatively where the size is too great, it can be made of two long, parallel sheets which are coplanar and interconnected at their centers in some suitable way to form a single sheet unit of double truss width.

In operation, as shown schematically in FIG. 2, the support plate 24 is arranged upon one of the two table halves. The table itself is divided into four stations, namely, load stations one and two located along one edge and the opposite ends of the table, and unload stations three and four similarly located on opposite ends of the table relative to the press.

Two piles **30** and **30***a* of pre-cut chord members **32** and web members **33** are arranged at the load stations, that is, at the opposite sides of the press alongside of the one edge of the table.

Workmen operating the apparatus lift from the pile **30** at station one the required number of chord members and web members and place them upon the load side **25** of the support plate **24.** Locator means formed upon the plate guide the location of the members. Thus, the plate is provided with a central guide bar **34** extending its length to function as a locator for one long chord member. A second guide bar **35** is loosely positioned upon the upper surface of the plate at a distance from the central guide bar **34.** Suitable mechanical clamps **36,** of any conventional construction, are arranged to clamp the movable guide bar **35** towards the fixed central guide bar **34.** Thus, a first chord may be positioned against the fixed guide bar **34,** a second chord member against the movable guide bar **35,** with the web members **33** located between to form abutting types of joints. With this arrangement, the wood members which are typically formed of conventional so-called 2×4's strips of lumber may be arranged with their wider cross-sectional edge upwards as illustrated in FIG. **3.**

Once the chord members **32** and the web members **33** are properly abutted, the clamps **36** may be applied to shove the movable guide bar **35** towards the fixed guide bar **34** and thereby tightly hold the parts in place. Other suitable clamping means may be used. Also, the guide bar may be changed in shape or angularity, that is, for example, being V-shaped to accommodate a V-shaped truss as opposed to a parallel chord truss described above.

At this point, the workmen lay over each of the abutted joints a metal truss connector plate **39** which comprises a flat sheet of metal having struck-out teeth **40.** The teeth rest upon the upper surfaces of the wood members.

Next, the entire plate **24** is slid endwise to the opposite half of the table so as to pass between the upper and lower press rollers **18** and **19** which are spaced apart a sufficient distance to accommodate and squeeze together the plate **24,** the truss members and the connector plates. As the plate and truss passes between the two rollers, the connector plates are squeezed downwardly so that their teeth **40** embed in their wood members.

At this point, as shown in dotted lines in FIG. **2,** the plate is now located at stations **2** and **3.** The workmen unclamp the truss and turn it upside down so as to flip it from station **2** into station **3** where it may be reclamped. At that point, workmen located at station **3** position connector or fastener plates over each of the now exposed joint faces while simultaneously workmen in station **2** load a new truss into position by taking chord members **32** and web members **33** from pile **30a.** Likewise, they position connector plates over the joints. The same workmen from station **1** normally walk to station **2** to perform the loading operation.

After the truss is loaded at station **2** and the exposed joint faces are covered with plates at station **3,** the plate **24** is again rolled endwise back through the press so that it now is aligned with stations **1** and **4.** The workmen now return from stations **2** and **3** to stations **1** and **4.**

At that point, the workmen at station **4** remove the completed truss **38** and put it in a pile in back of them, while simultaneously the workmen in station **1** release the truss at that position, and flip it over into station **4.** Again a new truss is assembled at station **1,** plates are applied to the exposed joint faces at station **4,** and the support plate is again rolled back through the press to repeat the cycle.

Since a typical joist type truss, as illustrated in the drawings may run in the order of 16 to 32 feet in length, the table is of considerable length as is the plate **24.** A single crew of three workmen at station **1** is sufficient to handle the loading at both station **1** and station **2** while a crew of two workmen at station **3** can handle both stations **3** and **4.** Of course, a separate crew may be used at each of the stations. However, it has been found that using only one crew at each of the two sides of the tables, each crew to handle two stations, walking back and forth between them, actually expedites the work, avoiding boredom and helping control and improve quality as the workmen remain more alert due to the movement back and forth.

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

1. An apparatus for making large wood trusses and the like devices formed of elongated spaced apart coplanar chords interconnected by web members whose ends are abutted against and joined to the respective chord members by metal fastener plates positioned over the joints and having struck-out teeth embedded into the portions of the chord and web members at said joints comprising:

an elongated, relatively narrow, horizontal table divided in half transversely and longitudinally to form four roughly equal table quarter portions, with each of said portions being longer and wider than the trusses to be made on said apparatus;

a press roller mounted transversely of the table at approximately the middle thereof, the roller extending substantially the full width of and spaced a short distance above the table;

a large, flat support plate divided into two plate portions, loosely supported upon and substantially covering the adjacent table quarter portions on one side of the press roller, with said plate being endwise slidable upon the table beneath the press roller from one end half of the table to the other;

locator means formed on the plate for locating precut chord and web members in assembled relationship upon each of the two plate portions;

and the space between the roller and the table being approximately equal to the thickness of the support plate and members located upon the support plate;

whereby chord and web members may be manually assembled in abutting relationship upon one plate portion and fastener plates may be loosely positioned over each of the joints, with their teeth down and rested upon the members, and thereafter, the entire support plate may be slid endwise beneath the press roller to the opposite end of the table so that the fastener plates are pressed downwardly and their teeth are embedded into the respective members by the pressure of the roller, and the truss may then be turned upside down and positioned upon the opposite support plate portion, and fastener plates arranged teeth down upon the joints and the support plate slid back under the rol-

ler to its original position for embedding fastener plates into the members at the opposite faces of said joints, and thereafter, the completed truss may be removed from said other plate portion.

2. An apparatus as defined in claim 1, and said table being formed of numerous closely spaced rollers extending transversely of the table for roller supporting the plate for endwise sliding from one end of the table to the other.

3. An apparatus as defined in claim 1, and including a lower press roller mounted beneath and in parallel alignment with the first mentioned press roller, with the uppermost edge of the lower press roller being substantially in the uppermost plane defining the top surface of the table, whereby the plate, chord and web members and fastener plates are squeezed together as a unit between the two press rollers for embedding the teeth of the fastener plate into said members.

4. An apparatus for making large wood truss-like devices formed of elongated spaced apart, coplanar wood chord members interconnected by web members, with the adjacent ends of said members being abutted and fastened together by metal fastener plates laid over the abutted joints in face to face relationship therewith and secured to the members by fastener plate struck-out teeth which are embedded into the adjacent member portions, comprising:

an elongated, relatively narrow table whose horizontal top surface is provided with transversely axised rollers;

a press roller extending transversely of the table between the ends thereof, the press roller being mounted above and with its lowermost edge spaced a short distance above the plane of the table top;

an elongated, flat, horizontally arranged, metal support plate loosely supported upon the table rollers for endwise sliding movement along the length of the table and between the table and the press roller, and said support plate being at least as long as a truss device to be made on the apparatus;

locator means formed on the upper surface of the support plate for locating pre-cut chord and web members in acutting truss-forming assembled relationship upon said upper surface;

wherein a fastener plate may be laid over each joint, teeth down, and the metal support plate with the members and fastener plates may be thereafter moved endwise beneath the roller press to the opposite ends of the table so that the roller press squeezes the fastener plates down against the members, in turn supported by the support plate, for embedding the fastener plates teeth into their adjacent member portions and the truss may then be turned upside down upon the metal support plate and fastener plates positioned over the opposite faces of the joints and the support plate again slid endwise beneath the press roller to thereby embed the teeth of the fastener plates for completing the assembled truss.

5. An apparatus as defined in claim 4, and including a lower press roller mounted beneath and in parallel alignment with the first mentioned roller, with the uppermost edge of the lower press roller being substantially in the uppermost plane defining the surface of the table, whereby the plate, chord and web members and fastener plates are squeezed together as a unit between the two press rollers for embedding the teeth of the fastener plates into said members.

6. A method for making large wood trusses and the like devices formed of elongated, spaced apart coplanar chords interconnected by web members whose ends are abutted against and joined to the respective chords by toothed metal fastener plates positioned over the opposite faces of each of the joints with their teeth embedded in the adjacent chord and web member portions, comprising:

positioning pre-cut chord and web members in assembled relationship upon one portion of a large, flat, elongated support plate having two adjacent portions, with each portion being of a size to completely support an assembled truss in face to face relationship with the support plate;

loosely positioning a metal fastener plate, teeth down, over each joint formed where the web members abut the chords;

sliding the entire plate horizontally and endwise through a roller press arranged transversely of the support plate to press said fastener plates against and to embed the teeth thereof into the chord and web members;

next, lifting said truss off said one plate portion and turning it upside down to rest in face to face relationship upon the other plate portion;

then positioning additional pre-cut chord and web members upon said one plate portion to assemble a second truss thereon and loosely positioning metal fastener plates, teeth down, over each joint thereof, while simultaneously loosely positioning similar fastener plates, teeth down, over the joints of the first mentioned truss;

then sliding the plate endwise through the roller press to return to its original location, to simultaneously embed the teeth of the fastener plates of both trusses;

thereafter removing the now completed truss now having embedded fastener plates on both faces of each of its joints from said other plate portion and then lifting and turning upside down the second truss and positioning it upon said other plate portion, and thereafter, repeating the cycle of assembling, positioning connector plates and passing through the roller press and so forth;

whereby pre-cut wood chord and web members for assembly into trusses are located adjacent one long edge of said one plate portion and on opposite sides of the roller press and the finished trusses are removed from said other plate portion at opposite sides of said roller plates.

7. A method as defined in claim 6 and wherein said plate is arranged upon an elongated table whose top is formed of numerous rollers arranged for supporting the plate for endwise sliding movement, with the table top transversely extending beyond both sides of the axis of the roller press and including the step of sliding the plate endwise upon said table top rollers through the roller press.

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