United States Patent [19]

Siel

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[54] **STUD AND DADO CUTTER**

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[52] **U.S. Cl.**.....**144/133 R,** 83/155.1, 83/404.4, 83/409.1, 83/425.2, 144/245 B

[51] **Int. Cl.**.....**B27c 5/04**

[58] **Field of Search**.....144/133 R, 242 D, 144/242 E, 41, 136 R; 143/1 R, 49 R, 49 A, 49 D; 83/155.1, 404.4, 409.1, 425.2

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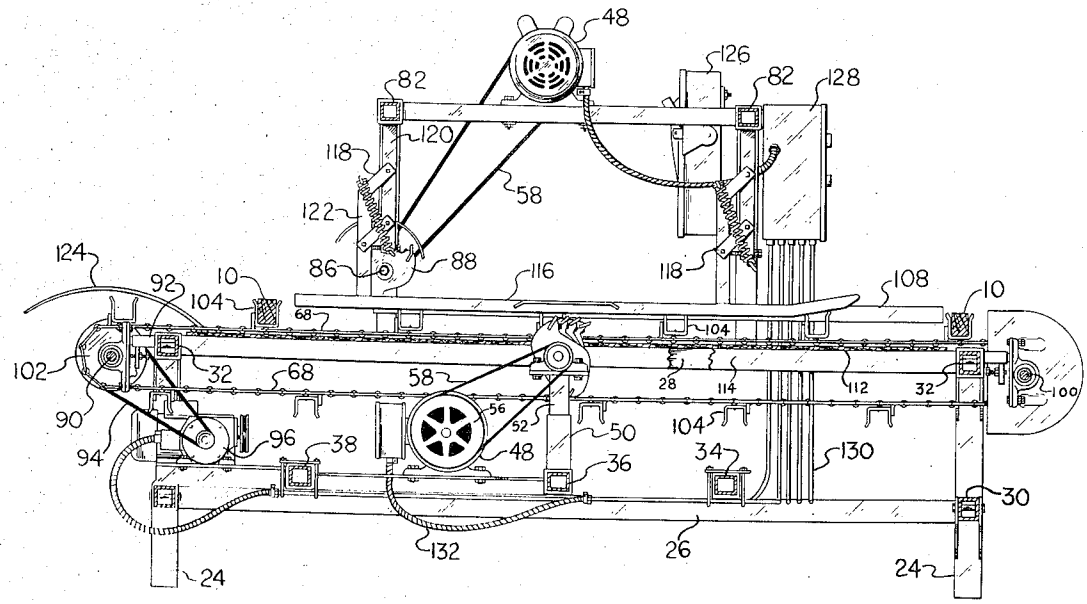
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[57] **ABSTRACT**

A series of wooden studs are clamped into a chain-feed means which moves them transversely of their length past a plurality of stations. At one station they are cut to length and at other stations dados are cut in them; thus producing a plurality of identical studs with dados therein.

7 Claims, 5 Drawing Figures



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SHEET 1 OF 3

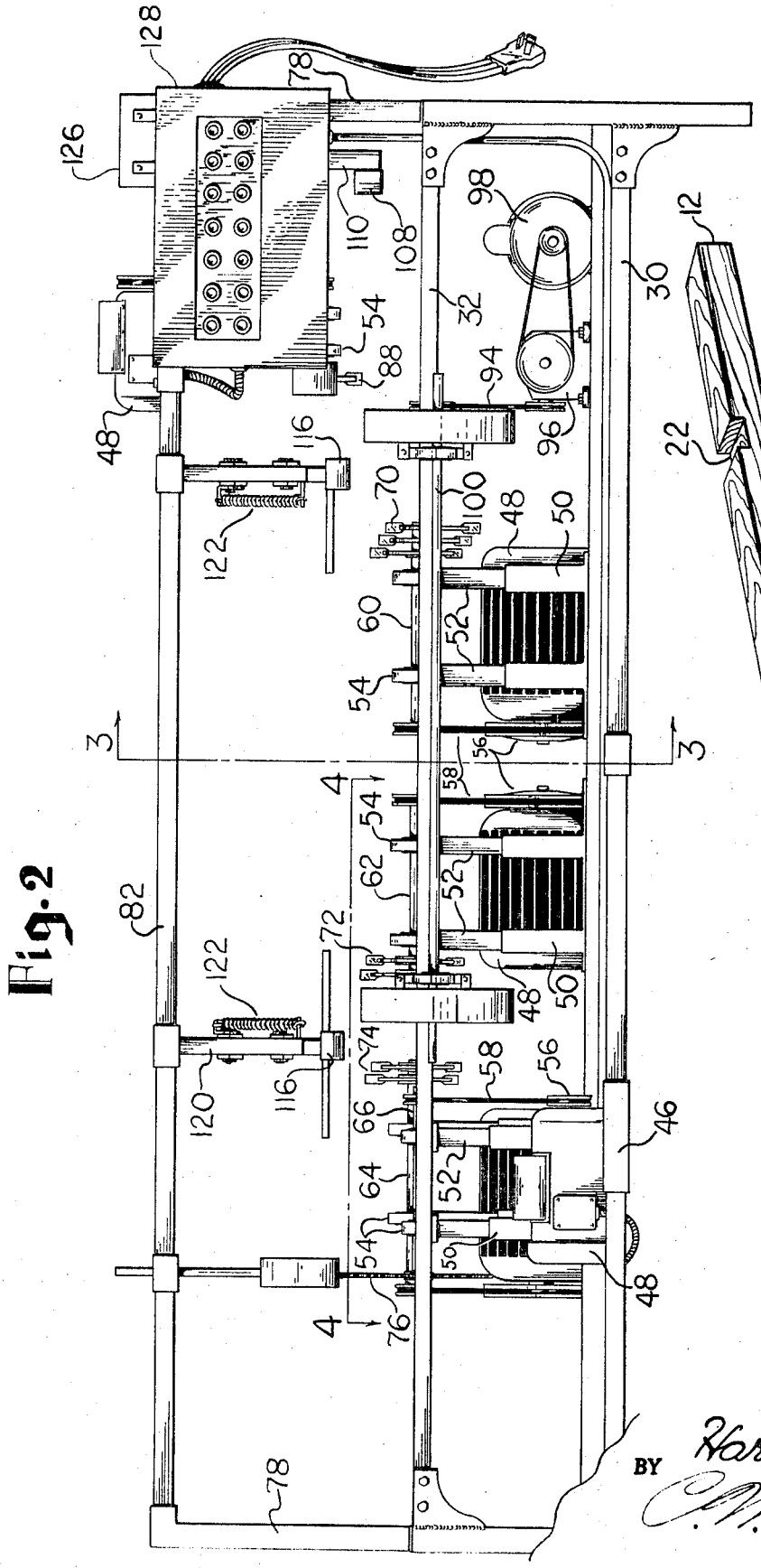


Fig. 2

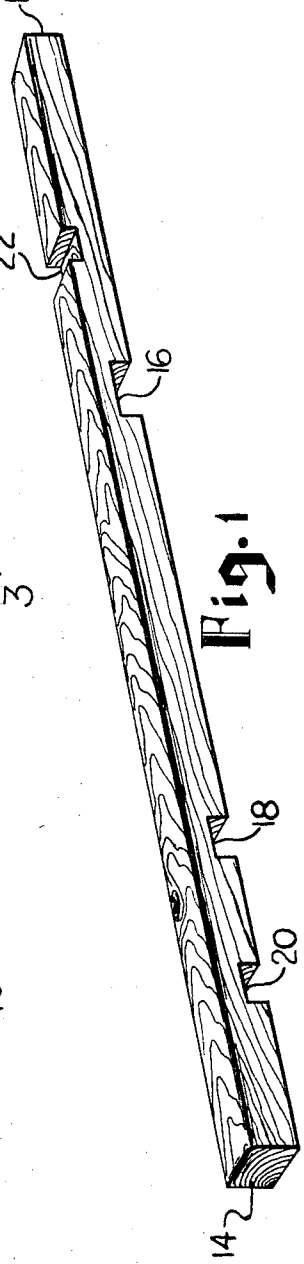


Fig. 1

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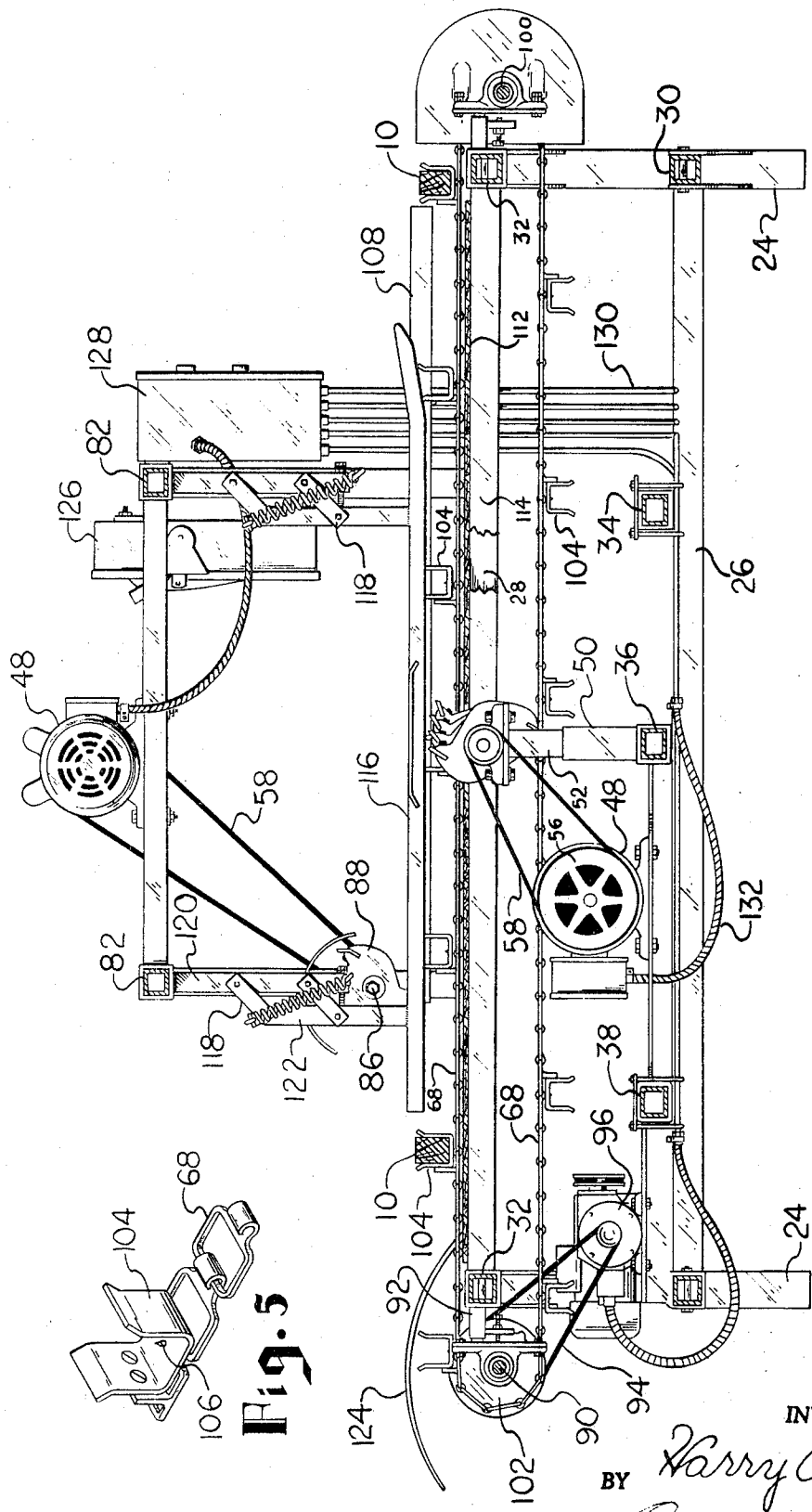


Fig. 3

Fig. 5

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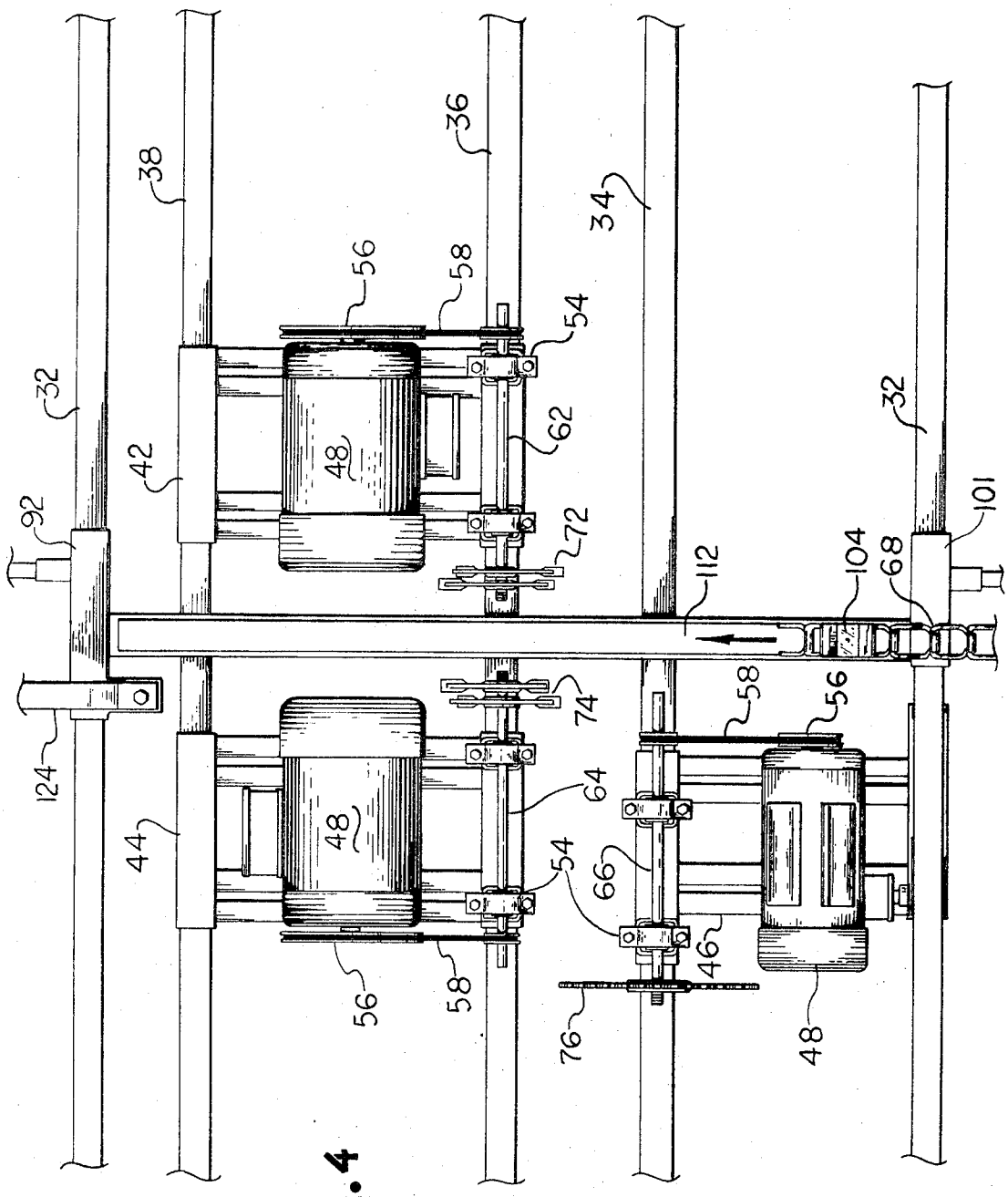


Fig. 4

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STUD AND DADO CUTTER

BACKGROUND OF THE INVENTION:

1. Field of the Invention

This invention relates to woodworking machines and more particularly to a machine for cutting studs to length and dadoing the studs.

2. Description of the Prior Art

At the present time, many mobile homes are being built. One of the reasons for the boom in mobile home building is that a living unit is readily constructed at a central location; therefore, adapting the construction to mass production or assembly line or standard part manufacture. The frame of the home or house is generally constructed of wood. Characteristically, a great number of studs are used in constructing the mobile home—all studs having the same length and being dadoed on the outside to receive belt line and being notched on the inside to receive wiring. Each structure will use several identical studs and if several structures according to the plans are built, thousands of identical studs are needed.

At the present time, these studs are cut and dadoed individually. I.e., a table saw is set and then an operator feeds several studs through the machine, cutting each of the studs to the desired length. Thereafter a dado machine is set to cut one dado and then each of the studs are fed through this machine; then, the machine is set to cut another dado and several studs are put through the machine cutting another dado. This process is repeated until each of the several operations are performed upon the studs.

SUMMARY OF THE INVENTION

1. New and Different Function

I have invented a machine which will perform all of the various cutting operations in a single series of steps. I.e., the stud is fed into the machine and one end of the stud is aligned to a guide and the other end of the stud cut to the precise length. The stud is advanced transversley past a plurality of stations wherein all dados and notches are cut into the stud as it proceeds automatically through one machine. Then, the completed stud is removed from the feed means at the other end of the machine.

The feed means includes a plurality of clips which are mounted upon two chains. The studs are placed against a guide bar on one end and pressed firmly in the clips. They are held in the clips against longitudinal movement as they are moved transversely. A limit means rides above the studs, not only holding them firmly in the clip, but more importantly preventing the studs (together with the chains and clips) from riding upward so the depth of the dado cut is limited.

Therefore, this machine receives the lumber at one side of the machine and when it comes out the other side of the machine it is a stud cut to proper length having therein dados and notches cut to specifications. A machine according to this invention could be used to work on many different pieces of lumber of a structural nature. It is not particularly designed to work on thin slabs such as are considered as planks, siding or shingles. Also, it is not necessarily designed to work on extremely heavy pieces such as might be called timbers. Applicant is unaware of a better term to use for the material upon which this machine operates other than the term "stud," it being understood that it is useful for operating on any of this type material and more particularly it is useful in operating on lumber commonly referred to as "two by fours" or "two by twos." Although I use the term "stud," it will be understood to include any similar piece of lumber.

OBJECTS OF THIS INVENTION

An object of this invention is to cut studs to length with dados and notches cut therein.

Another object of this invention is to provide feed means for a machine which will properly hold and feed the studs through the machine.

Further objects are to achieve the above with a device that is sturdy, compact, durable, lightweight, simple, safe, efficient, versatile, and reliable, yet inexpensive and easy to manufacture, install, adjust, operate, and maintain.

Other objects are to achieve the above with a method that is versatile, rapid, efficient, and inexpensive, and does not required skilled people to install, adjust, operate, and maintain.

BRIEF DESCRIPTION OF THE DRAWING:

FIG. 1 is a perspective view of a finished stud according to this invention.

FIG. 2 is a front elevational view of a machine according to this invention.

FIG. 3 is a sectional view taken substantially along line 3—3 of FIG. 2 with additional parts broken away for clarity.

FIG. 4 is a top sectional view showing a portion of the machine taken substantially along line 4—4 of FIG. 2.

FIG. 5 is a perspective view of a clip showing details thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS:

Referring more particularly to the drawing, FIG. 1 shows stud 10 after having been processed by this machine.

The finished stud 10 has a definite length from guide end 12 to cut end 14. Also, on one side it has three dados: lower dado 16 near the guide end, middle dado 18, and upper dado 20 near the cut end 14. On the other side the finished stud 10 has a dado which is called herein notch 22 for the purpose of attaching wiring into the interior of the finished structure.

The machine to perform this operation includes a frame (FIGS. 2, 3, and 4). The frame includes four legs 24. On each end of the machine, the legs are connected by lower beam 26 and upper beam 28. Also, the legs from one end to the other are connected by lower stringers 30 and upper stringers 32. The rails 34, 36, and 38, extend from the lower beam 26 on one end to the lower beam 26 on the other.

Carriages 40, 42, 44, and 46, are mounted either upon two of the rails or upon one rail and a stringer for longitudinal movement along the rails. They are conveniently secured at a preset location to the rails by U-bolt clamps or by sleeves extending around the rails or stringers with setscrews therein. Each carriage has an electric motor 48 mounted thereon. Also, each carriage has two tubes 50 attached thereto (FIGS. 2 and 3), as by welding, extending vertically upward. Each tube 50 has a pedestal 52 telescoped therein and is maintained securely in position by setscrews. On the top of the pedestal 52 is mounted journal bearing 54.

The electric motors 48 each have a sheave 56 which is used to drive V-belt 58.

The carriage 40 has dado shaft 60 journaled within its journal bearings 54. The carriage 42 has dado shaft 62 journaled in its bearings 54, the carriage 44 has dado shaft 64 journaled in its bearings 54, and the carriage 46 has cutoff shaft 66 journaled within its bearings 54. It will be noted that dado shaft 60, 62, and 64 are parallel to the cutoff shaft 66 and that the rails 34, 36, and 38, and the lower stringers 30 and 32 are also parallel to the cutoff shaft 66.

The upper stringer 32 and the upper beams 28 form a working level. Chains 68 feed the studs 10 across this working level as will be explained more fully later. Dado head 70 mounted upon dado shaft 60 extends into the working level. Likewise dado head 72 on shaft 62 and head 74 on shaft 64 extend into the working level. In a similar manner cutoff saw 76 mounted upon cutoff shaft 66 extends into the working level. By working level I mean that plane or flat surface which is formed at the top of the upper stringers 32 and upper beams 28. Therefore, it may be seen that as the stud 10 is moved across the working level by the feed means, which includes the chain 68, dado head 70 will cut the lower dado 16 into stud 10 and dado head 72 will cut middle dado 18 into the stud. Likewise the dado head 74 will cut the upper dado 20 into the stud. The cutoff saw 76 will cutoff the stud at the cut end 14 which is a preset distance from the guide end 12.

A super structure is constructed above the working level. The super structure includes four stanchions 78 which are attached to the top of the upper beams 28. The end two stanchions 78 are connected by overhead beams 80. Overhead rails 82 connect the tops of the stanchions 78 from one end to the other. The overhead rails 82 are parallel to the rails 34, 36, and 38, and therefore, are also parallel to cutoff shaft 66. Overhead carriage 84 extends from one overhead rail 82 to the other. Like the other carriages 40, 42, 44, and 46, it also has an electric motor 48 thereon which is connected by V-belt 58 on motor sheave 56 to drive notch shaft 86 which is journaled within bearings 54 which themselves are connected to pedestals and tubes which depend vertically downward from the overhead carriage 84. Notch dado head 88 is mounted upon the notch shaft 86 and it extends into or immediately above the working level. Therefore, as the studs are fed across the machine, the notch dado head will cut notch 22 into each of the studs 10.

The feed means includes drive shaft 90 which is journaled to carrier 92 which is attached by sleeves or the like to the back upper stringer 32. The drive shaft 90 is powered by belt 94 from speed reducer 96 driven by electric motor 98. Front shaft 100 is journaled in bearings carried by carriers 101 which are attached by sleeves to the front upper stringer 32. Sprocket 102 upon the shaft 90 and shaft 100 carry the two chains 68.

Clips 104 are attached to the chains 68 (FIGS. 3, 4, and 5). The clips are U-shaped in configuration with the bight flat or parallel to the chain and two side arms extending up therefrom. Self-threading screw 106 is threaded through the bight of the clip so it projects from the bottom of the clip as a pin. The width between the arms of the clip is about the same as the width of the stud 10 so that the stud 10 fits snugly within the clips. To feed the machine, the operator jams the guide end 12 of the stud 10 against guide bar 108 and pushes the stud into two aligned clips 104. The clips 104 on the two chains 68 will be aligned. The screws 106 projecting through the bight of the clip 104 will prevent longitudinal movement of the stud 10 after the operator releases the stud in the clip. Therefore, the stud will remain in proper position as the end 14 is cut to length by cutoff saw 76 and as each of the dados and notches will be in the proper place as they are cut. The guide bar 108 is held in proper position by arms 110 attached to the frame of the machine.

The chains 68 travel over tracks 112 in the form of wooden slats attached to metal track support members 114. Each support member 114 extends from one of the carriers 92 to one of the other carriers 101. Upward movement of the studs 10 as they are fed through the machine is prevented by limit bars 116. These limit bars are connected by parallel motion links 118 to pendents 120 which are carried on carriers which are telescoped along the overhead rails 82. The limit bars are biased downward by helical tension springs 122 as seen in the drawings. Therefore, as the studs are fed through the machine, they are held securely in the clips 104 by the limit bars 116. The pressure of the dado heads 60, 62, and 64, might cause the studs to rise upward, but the limit bars 116 prevent this. Thus, the dado is cut the proper depth. It will be noted in the drawing, FIG. 3, the limit bars 116 are shown in the down position as they would be when there are no studs 10 in the clips 104; whereas, in FIG. 2, they are shown in the raised position.

Curved stripper bar or shucker 124 is attached to the carrier 92 adjacent each of the chains 68. Each of the shuckers is a metal strap which extends from below the working level to above the working level at the edge of the frame. As may be seen in the drawings, the bottom edge of the stud 10 will strike the shuckers 124 and the stud will be moved up and out of the clips 104 after they have been completely worked upon by the machine.

The power to each of the motors is supplied to main switch box 126 and starter switches in the starter box 128. From starter box, the power goes to the individual motors through conduits 130 and armored cables 132. Inasmuch as switches and electrical connections and conduits are all conventional, these conduits and armored cables have been shown in FIG. 3, however, the armored cables are not shown in all positions in FIG. 1, and also is not shown in FIG. 4 for clarity of the drawings.

Those skilled in the woodworking art will know desirable speeds for the chain 68 to run and also the desirable speeds for the cutoff saw 76 and the dado heads 74, 72, and 70; therefore, this information is not contained in this application. Many of the sprockets and cutting tools are furnished with shields, some of which have been illustrated in the drawings, but have not been described inasmuch as they are conventional in nature and the attachment of them would be well within the skill of ordinary mechanics.

The embodiment shown and described above is only exemplary. I do not claim to have invented all the parts, elements or steps described. Various modifications can be made in the construction, material, arrangement, and operation, and still be within the scope of my invention. The limits of the invention and the bounds of the patent protection are measured by and defined in

the following claims. The restrictive description and drawing of the specific example above do not point out what an infringement of this patent would be, but are to enable the reader to make and use the invention.

I claim as my invention:

1. A wood working machine comprising:
a. a frame including
b. structure forming a working level,
c. feed means for feeding wooden studs transversely across working level,
d. a cutoff saw mounted on
e. a cutoff shaft journaled to the frame,
f. said studs parallel to said cutoff shaft,
g. power means on the frame for rotating said cutoff shaft,
h. said cutoff saw in the working level,
j. dado heads mounted on
k. dado shafts journaled to the frame,
m. each dado shaft parallel to said cutoff shaft,
n. power means on the frame for rotating said dado shafts,
o. each dado head in the working level,
p. two feed shafts journaled to the frame,
q. said feed shafts parallel to said cutoff shaft,
r. two chains trained over
s. sprockets on said feed shafts, and
t. clip means on the chains for grasping the studs, including:
i. U-shaped clips adapted to receive the stud within the "U" having
ii. a bight flat to the chain, and
iii. a self-threading screw
iv. threaded through the bight of the clip,
v. said screw functioning as a pin to embed itself into the stud.

2. The invention as defined in claim 1 with the additional limitation of
u. shuck means on the frame for shucking the studs from the clip means, including:
i. a strap attached to the frame adjacent each chain,
ii. said strap extending from below the working level to above the work level.

3. The invention as defined in claim 1 with the additional limitation of
u. guide means on the frame for guiding the studs in the correct relationship to said cutoff saw and dado heads.

4. The invention as defined in claim 3 with the additional limitation of
v. limit means on the frame for limiting the studs to the working level so that the depth of the dado cut by the dado heads is determined.

5. The invention as defined in claim 4 with the additional limitations of
w. said frame including rails,
x. parallel to said cutoff shaft,
y. carriages mounted for movement along said rails,
z. said power means each being an electric motor,
aa. each of said dado shafts and its electric motor mounted on one of said carriages, whereby the position of said dado is readily adjusted, and
aaa. a belt driving the dado shaft from the electric motor.

6. The invention as defined in claim 5 with the additional limitations of
bb. each of said dado shafts journaled to two pedestals each of which are telescoped within
cc. a tube connected to one of said carriages,
dd. said pedestals transverse of said working level so that by moving the pedestals in the tubes the depth of dado may be adjusted.

7. The invention as defined in claim 6 with the additional limitation of
ee. shuck means on the frame for shucking the studs from the clip means, including:
i. a strap attached to the frame adjacent each chain,
ii. said strap extending from below the working level to above the work level.

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