

April 26, 1949.

A. ELMENDORF

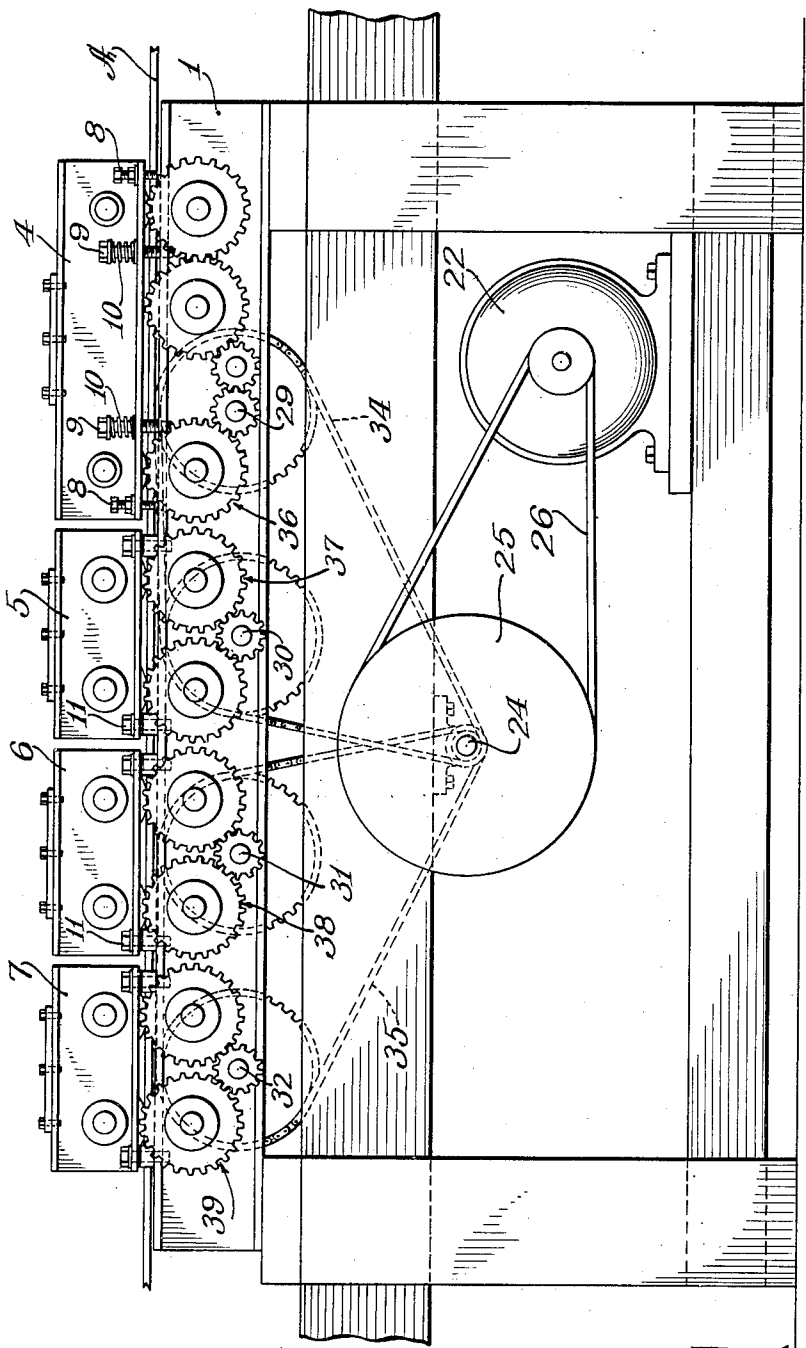
2,468,595

MACHINE FOR SLITTING AND WIDENING BOARDS

Filed Sept. 7, 1945

4 Sheets-Sheet 1

FIG. 1.



Inventor:
Armin Elmendorf
By Wm. F. Freudenreich,
Attorney

April 26, 1949.

A. ELMENDORF

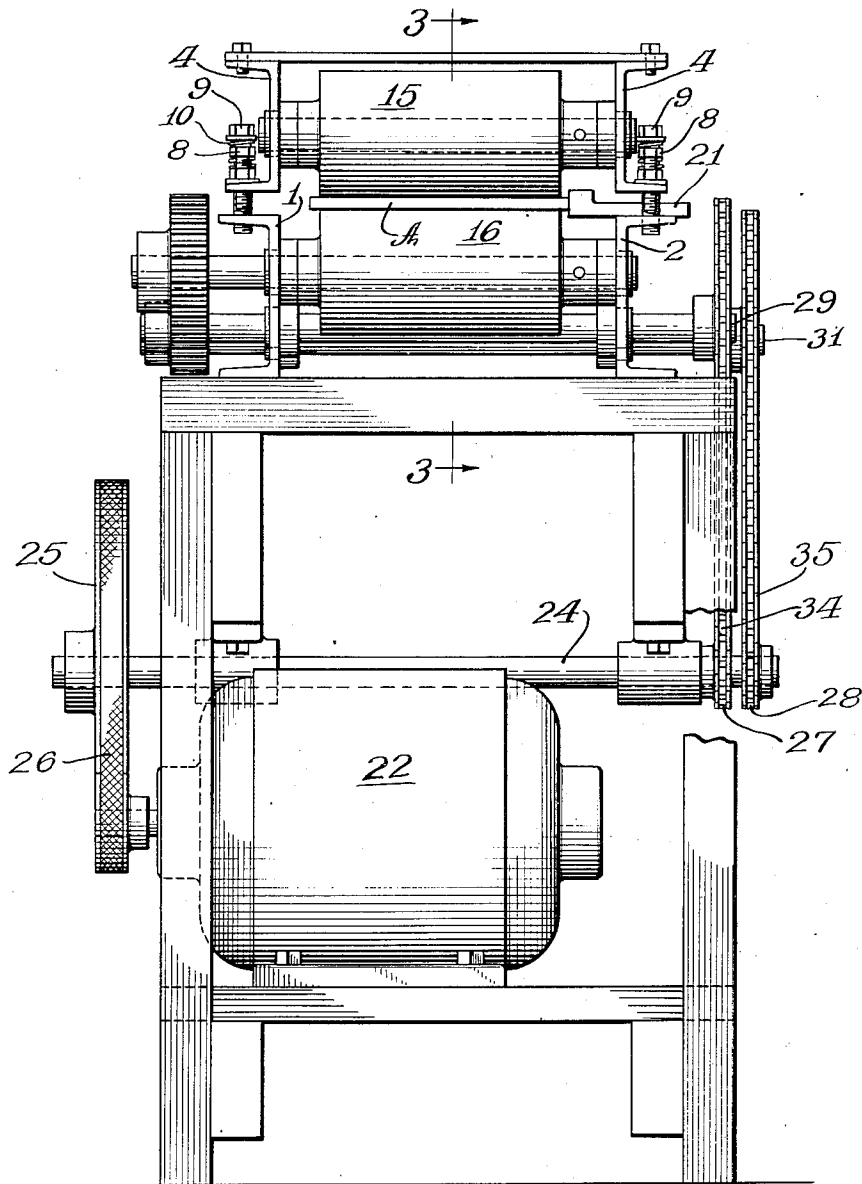
2,468,595

MACHINE FOR SLITTING AND WIDENING BOARDS

Filed Sept. 7, 1945

4 Sheets-Sheet 2

FIG. 2.



Inventor:
Armin Elmendorf
By *W. H. Freundreich*,
Attorney

April 26, 1949.

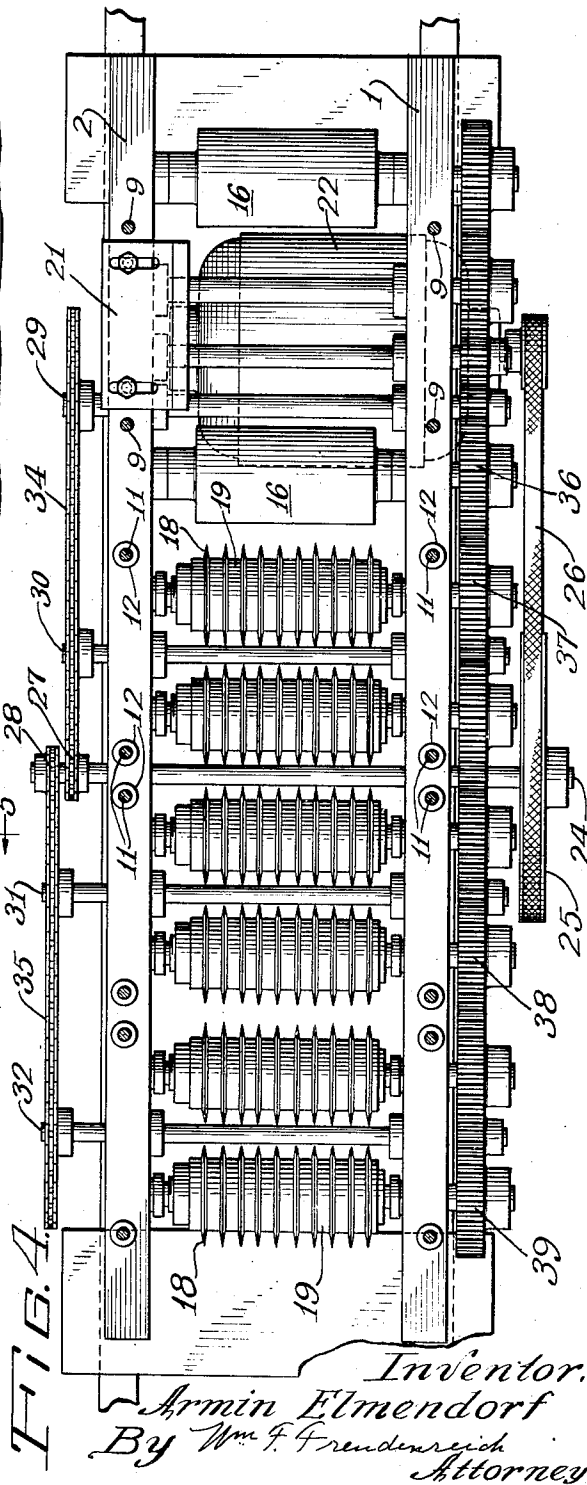
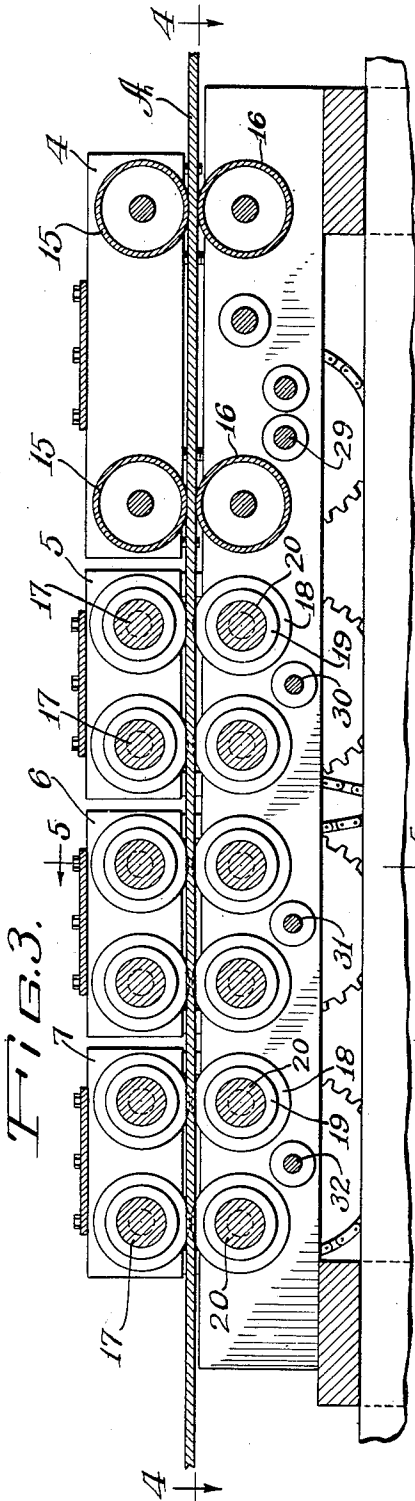
A. ELMENDORF

2,468,595

MACHINE FOR SLITTING AND WIDENING BOARDS

Filed Sept. 7, 1945.

4 Sheets-Sheet 3



Inventor:
Armin Elmendorf
By Wm. F. Freudenreich
Attorney

April 26, 1949.

A. ELMENDORF

2,468,595

MACHINE FOR SLITTING AND WIDENING BOARDS

Filed Sept. 7, 1945

4 Sheets-Sheet 4

FIG. 5.

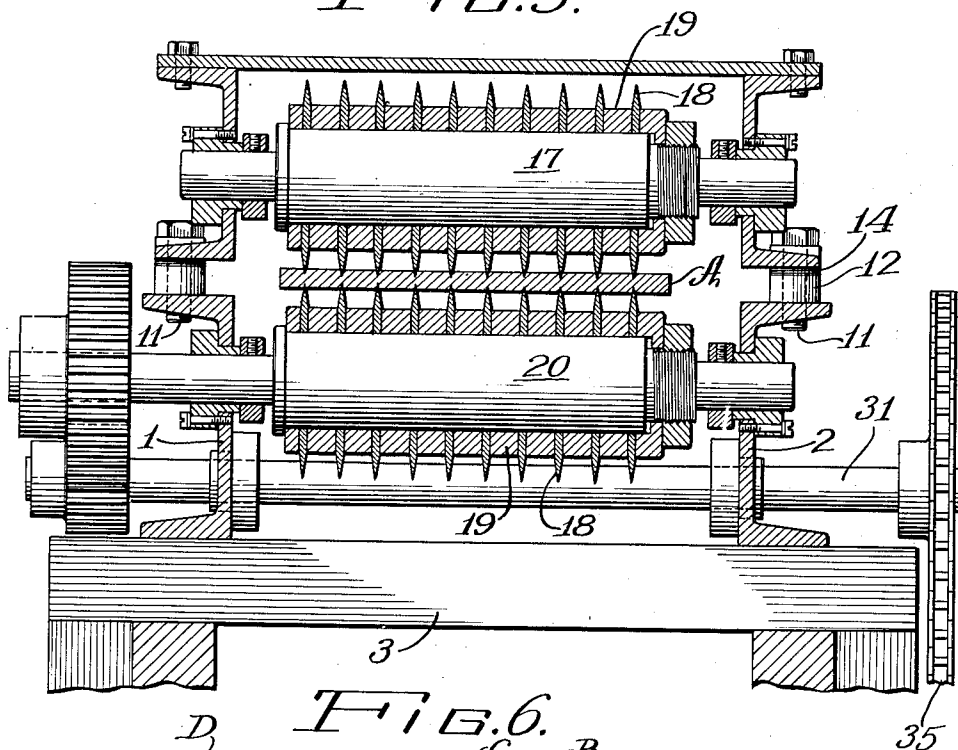


FIG. 6.

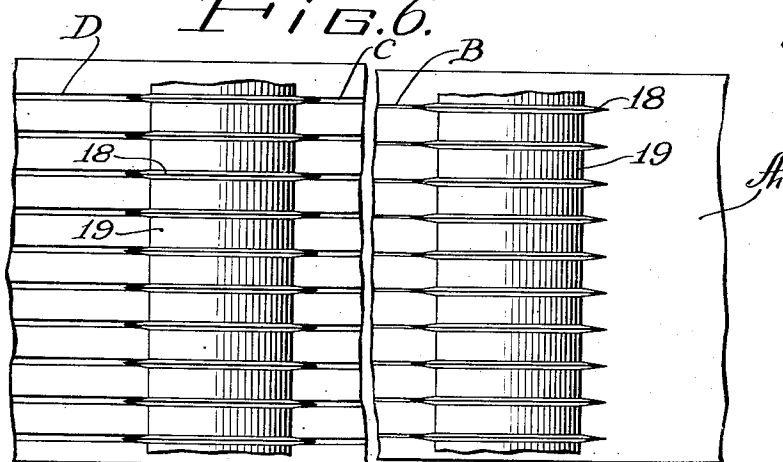
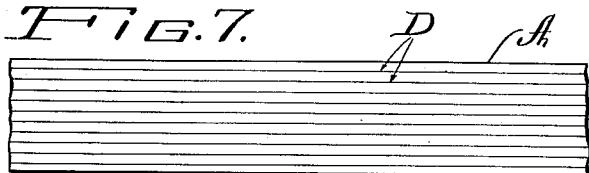


FIG. 7.



Inventor:
Armin Elmendorf
By Wm. F. Freudenreich
Attorney

UNITED STATES PATENT OFFICE

2,468,595

MACHINE FOR SLITTING AND WIDENING
BOARDS

Armin Elmendorf, Winnetka, Ill.

Application September 7, 1945, Serial No. 614,843

5 Claims. (Cl. 144—2)

1

There has heretofore been used a type of flooring comprising thin wood board material bonded to a flexible backing; the wood being in a state of having been dried under constraint so as to retain a width almost as wide as its width in a green state and much wider than in cases where drying is carried out without constraint. Although wood dried under constraint does not lose in width while drying, this condition is not fully maintained after the constraint is removed; a small loss in width occurring through elastic contraction of the wood upon opening the press in which drying has been carried out. This loss in width must be restored if trouble, due to increase of moisture in the wood during the use thereof as a flooring, is to be avoided.

The object of the present invention is to produce a simple and novel machine for widening a wood board material, dried under constraint, to compensate for the aforesaid elastic contraction of the wood.

It is desirable that the board material be divided into strips at least partly separated from each other, so that expansion and contraction that takes place in each strip is localized there and exerts no influence in other areas.

Viewed in one of its aspects, the present invention may be said to have for its object to produce a simple and novel machine for slitting board material into strips, that still remain attached to each other, and simultaneously increasing the overall width of such material to compensate for the aforesaid elastic contraction.

The various features of novelty whereby the present invention is characterized will hereinafter be pointed out with particularity in the appended claims; but, for a full understanding of the invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a side view of a machine embodying the present invention; Fig. 2 is an end view of said machine, looking at the same from a point to the right of Fig. 1; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a section on line 4—4 of Fig. 3; Fig. 5 is a section on line 5—5 of Fig. 3, but on a larger scale; Fig. 6 is a top plan view, showing only the first and last of the upper slitting cutter groups and an underlying board that is passing through the machine, and the portions of the machine and board between these two groups of slitters being omitted; and Fig. 7 is a face view of a board material, in the form of a flooring plank, that has gone through the machine.

2

What may be termed the frame of the machine comprises two long, horizontal, parallel main beams or heavy rails 1 and 2 mounted on a solid base 3 of any suitable construction; members 1 and 2 being shown as taking the form of large channel bars set on edge. Above and supported by each of said beams or rails is a sectional beam extending throughout almost the entire length of the same; the sectional beams being adjustable vertically. In the arrangement shown, the sectional beams are channel bars somewhat lighter than members 1 and 2, and each being made up of four sections, 4, 5, 6 and 7, although the number of sections may be varied. Sections 4 are at the receiving end of the machine end, when the machine is empty, are supported by two heavy screws 8, 8 screwed through the lower flange of each section and projecting far enough at the bottom to hold the sections in any desired spaced relation to the main beams. By adjusting these screws the spacing between the lower beams and sections 4 may be varied. Two other, longer screws 9, 9 extend loosely through the lower flange of each section 4, as shown, and are screwed into the top of the corresponding main beam. Each of the screws 9 is surrounded, above the flange through which it loosely extends, by a coil spring 10. One end of each spring rests on the flange through which it loosely passes and bears at its upper end against the under side of the head on its screw; whereby the spring tend constantly to hold sections 4 down with screws 8 resting on the main beams, while permitting such sections to be raised through limited distances.

Each of sections 5, 6 and 7 is rigidly connected to the underlying main beam. Two screws 11 pass loosely through the lower flange of each section, as shown, and are screwed into the top of the corresponding main beam. These screws are long enough to permit spacers to be placed between the top of each main beam and the corresponding sections 5, 6 and 7. In the arrangement shown, each spacer comprises a sleeve member 12 and any desired number of shims, in the form of washers 14, surrounding one of the screws. By inserting or removing shims each of sections 5, 6 and 7 may be adjusted vertically independently of the others.

Extending transversely between beam sections 4, 4 are two feed rollers 15 and, directly below the same, are cooperating rollers 16 that extend between and are rotatably supported by main beams 1 and 2.

Extending transversely between and rotatably mounted in each pair of beam sections 5, 6 and 7

3

are two shafts 17 of large diameter on which are arranged groups of cutting discs 18 held apart by spacers 19. The number of discs on each shaft should equal the number of slits to be cut into a face of a board operated upon by the machine. Directly below each slitting unit is a similar unit extending between and rotatably supported by the main beams, the shafts for these lower units being numbered 20. The slitting discs in each upper unit lie in the same vertical plane as the corresponding discs in the unit immediately below it. The spacing between the slitting discs increases progressively from the first slitting unit of each series to the last. That is accomplished by increasing the width of the spacers. No attempt has been made to bring out this feature in Fig. 4; but Fig. 6 illustrates what may be termed the increase in the effective length of the slitting units from the first to the last of either the upper or lower series, due to increases in the widths of the spacers between slitting discs.

The cooperating slitting units of each pair differ from the other units in still another respect, namely, in the width of the gap between the lowest point in the cutting edge of each upper disc and the highest point in the corresponding lower disc. This is brought about by decreasing the number of shims on the screws 11 throughout the series on each side of the machine, from right to left as viewed in Fig. 1. By this means the cutters of the first pair of slitting units may be caused to penetrate a board only to a slight depth through each face, the cutters of the next pair penetrating a little deeper, and so on until the cutters of the final pair practically meet at the middle of the board.

From the foregoing it will be seen that a board that is fed through the machine will be cut along parallel lines to a greater and greater depth and be transformed into strips that are progressively pushed apart as they are being created; this spreading being due to the progressive widening of the spacings between the slitting discs as the depth of the cuts or slits increases.

The width of the strips is a matter of choice. For most purposes a width of about one half inch is satisfactory, particularly in flooring. The permanent expansion produced by the machine should ordinarily be from 1% to 2% of the width of the board as it enters the machine, depending on the kind of wood. Thus, in the case of a board nine inches wide, the initial expansion may be in the neighborhood of three sixteenths of an inch; which, allowing for a "spring back" after being clear of the last pair of slitting units, will provide a final, permanent width increase of from one eighth of an inch to five thirty-secondths of an inch. Small as this increase is there has heretofore been no means for achieving it in an entirely satisfactory way in the commercial production of this type of flooring.

It is advisable to provide means to enter a board properly between the feed rollers, after which no further guiding devices are needed. As best shown in Figs. 2 and 4, there is a transversely adjustable guide plate or shoe 21 mounted on top of main beam 2 adjacent to the feed rollers and in the plane of a board A that is entering or is in the machine. With the machine running, the operator need only insert a board between the feed rollers, with one edge bearing against the guide, and the machine will carry the board through the same; the board being slitted and expanded, without being completely separated into a plurality of pieces, in its progress through the machine. In

4

Fig. 6 the right hand end of the board has not yet reached the first slitting cutters; after passing between the first pair of slitting units it contains fine shallow slits B; just before reaching the last pair of slitting units the slits are of almost full depth and width, as indicated at C; and, after having been acted upon by the last pair of slitting units, the slits are of full depth and width, as at D.

The rotating parts of the machine may be driven in any suitable way. In the arrangement shown, only the lower feed rollers and the lower slitting units are positively driven, those on the upper side being driven through their engagement with the moving board. A single motor 22 is located within the base of the machine near one end of the latter. At about the middle of the machine is a shaft 24 that extends transversely across the interior of the base and has thereon a pulley 25 around which a belt 26, driven by the motor, passes. The pulley 25 is on one side of the machine while on shaft 24, on the opposite side of the machine are two sprocket wheels 27 and 28. There are four transverse shafts 29, 30, 31 and 32 extending between and rotatable in main frame members 1 and 2; there being one shaft below each pair of frame sections 4, 5, 6 and 7. A sprocket chain 34 extends around sprocket wheel 27 and sprocket wheels on shafts 29 and 30. A sprocket chain 35 extends around sprocket wheel 28 and sprocket wheels on shafts 31 and 32. Shaft 29 drives feed rollers 16 through gearing indicated as a whole by 36; shaft 30 drives the two slitting units below sections 5 of the sectional beams, through gearing 37; shaft 31 drives the two slitting units below beam section 6 through gearing 38; and shaft 32 drives the last two lower slitting units through gearing 39.

It will thus be seen that, having adjusted the machine for operation on boards of given thickness, the operator needs only to start the motor and feed boards into the machine in order to slit them in such a manner that the individual strips created will be so independent of each other that each may be regarded as a separate piece that cannot influence others, although the strips are all lightly but effectively united and the board will not fall apart before a backing can be applied. So, also, the boards are now as wide or a little wider than they were in the green state, and no further work need be done thereon to ensure that when used as a flooring no change in the moisture content will have harmful effects. The expansion in width of the board is, of course, the result of a slight stretching of the wood that remains uncut at the bottom of each slit. There is very little such wood because the upper cutters in the last pair practically meet those in the lower unit. If this wood was not already split, during drying, only a small force is required to rupture it.

The machine can easily be adjusted to adapt it to boards of any given thickness. One need only add or subtract shims to raise or lower frame sections 5, 6 and 7, or any of them and adjust screws 8 and 9 associated with frame section 4. Each upper slitting unit is, in effect, adjustable independently of all the others, because the two supports for each frame section 5, 6 and 7 are near the ends of the same and shims may be added or removed at one end without disturbing the other end and the slitting unit at that end.

I claim:

1. In a slitting machine, a series of pairs of transverse rotary slitting units adapted to cut a plurality of slits through both faces of a board passed between the units of each pair, each unit

5

containing the same number of slitting elements, each pair of units comprising an upper and a lower unit, the axes of all the units being parallel to each other, the pairs of units being spaced apart lengthwise of the machine with corresponding pairs of slitting elements arranged one in advance of the other so that each slitting element operates in the same slit as do the corresponding elements in the other units that lie on the same side of the board, the slitting elements in the upper unit of the first pair being spaced apart from the corresponding elements in the lower unit a distance slightly less than the thickness of the board and such spacing decreasing progressively throughout the series, and the distance between the slitting elements in the units of each pair increasing progressively, as the spacing between the upper and lower slitting elements decreases, to cause the slitting elements to expand the board in width.

2. In a slitting machine, a series of transverse rotary slitting units adapted to cut a plurality of slits through a face of a passing board, each unit containing the same number of slitting discs, the axes of all the units being parallel to each other, the units being spaced apart lengthwise of the machine with corresponding discs in the units arranged one in front of the other so that each disc operates in the same slit as do the corresponding discs in the other units, the axes of the discs being spaced at progressively decreasing distances from the path of the board so as to make progressively deeper cuts from one end of the series to the other, and the distance between the discs in the units increasing throughout the series to cause the discs to exert a wedging action that expands the unslitted wood at the bottom of each slit and thus expands the board in width.

3. In a slitting machine, a series of pairs of transverse rotary slitting units adapted to cut a plurality of slits through both faces of a board passing between the units of each pair, each unit containing the same number of slitting discs, each pair comprising an upper and a lower unit, the axes of all the units being parallel to each other, the pairs of units being spaced apart lengthwise of the machine with corresponding pairs of discs arranged one in advance of the other so that each disc operates in the same slit as do the corresponding discs in the other units that are positioned on the same side of the board, the distance between the upper and lower discs in each pair of units being less than the thickness of the board and the distance between the discs in the units of each pair increasing throughout the series to cause the discs to exert a wedging action that expands the unslitted wood at the bottom of each slit and thus expands the board in width, and the distance between the upper and lower discs decreasing as the spacing of the discs within the units increases.

4. In a slitting machine, a base, a pair of long,

6

parallel, stationary main beams or frame members arranged horizontally on said base in spaced relation to each other, two beams each composed of short sections overlying said main frame members and extending lengthwise of the same, means securing each of said sections to its underlying frame member independently of the other sections, lower feed rollers and a series of lower rotatable slitting units extending between and supported by said main frame members in spaced relation to each other lengthwise of the machine, upper feed rollers and upper slitting units extending between and rotatably supported by said sectional beams in cooperating relation to the lower feed rollers and slitting units, respectively, and spacers interposed between the main frame and the sections carrying the upper slitting units, which spacers include thin shims the number of which may be varied in the case of any spacer in adjusting the upper slitting units in the vertical direction.

5. In a board slitting machine, a series of slitting units spaced apart from each other lengthwise of the machine and each extending transversely of the machine, feeding means in advance of the slitting units to move a board lengthwise past and in working relation to said slitting units, each unit being composed of a group of individual slitting elements spaced apart from each other transversely of the machine; the slitting elements in the first unit, which is the one nearest the feeding means, being positioned with their cutting edges extending slightly past the plane in which the face of the board to be slit travels, to make shallow cuts into the boards, and the slitting elements of the other units being positioned to extend their cutting edges farther beyond said plane to increase the depths of such cuts before they pass beyond the unit farthest from the feeding means; and the spacings between the slitting elements in the several units increasing slightly, from the first to the last.

ARMIN ELMENDORF.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
417,216	Bailey	Dec. 17, 1889
1,012,434	Prenzel	Dec. 19, 1911
1,198,685	White	Sept. 19, 1916
1,327,923	Phillips	Jan. 13, 1920
1,635,662	Dean	July 12, 1927
1,706,675	Osgood	Mar. 26, 1929
1,795,493	Kessler	Mar. 10, 1931
2,093,241	Huguley	Sept. 14, 1937
2,215,658	Arens	Sept. 24, 1940
2,346,131	Frater	Apr. 11, 1944
2,347,820	Francek	May 2, 1944
2,349,205	Stilwell et al.	May 16, 1944