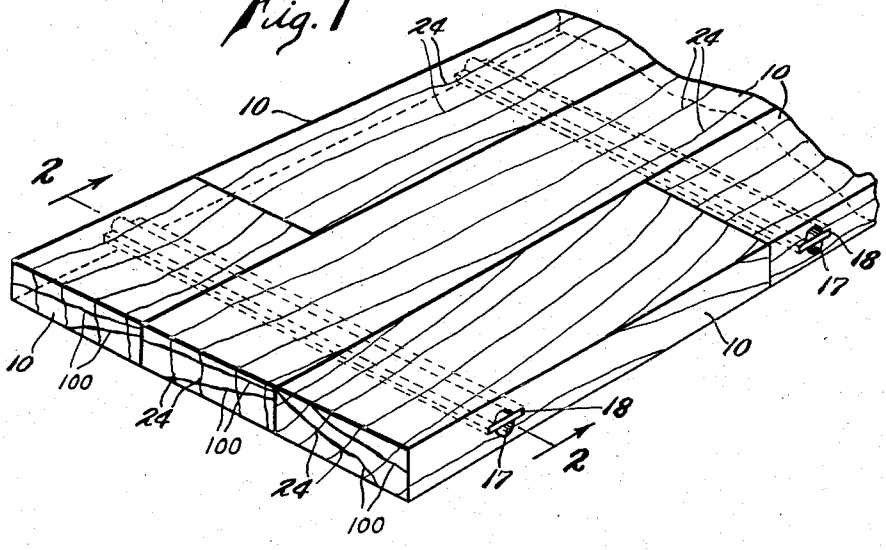
Sept. 1, 1953 P. DE ANGUERA 2,650,395

STRUCTURAL WOOD UNIT

Filed Dec. 16, 1948

Fig. 1



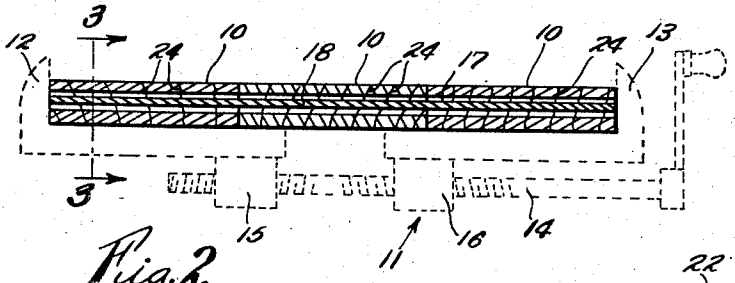
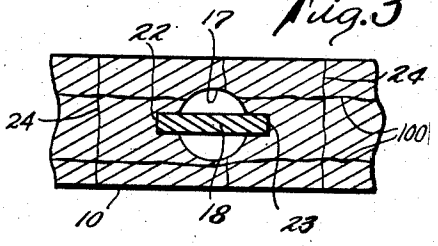


Fig. 2

Fig. 3



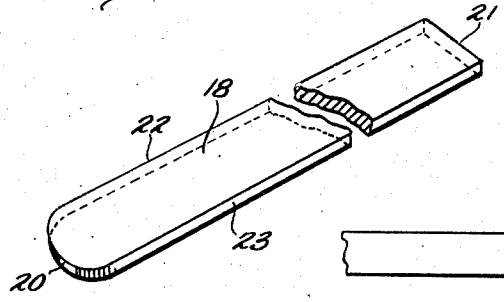


Fig. 4

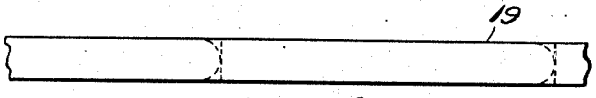


Fig. 5

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STRUCTURAL WOOD UNIT

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Application December 16, 1948, Serial No. 65,657

1 Claim. (Cl. 20—91)

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The present invention relates to improvements in structural wood units and is particularly directed to a prefabricated, composite unit which is especially useful as a floor panel and relates particularly to flooring manufactured from lower grades of lumber and which in use is to be subjected to intensive wearing actions and/or changes in temperature and moisture such as might exist by exposure to climatic conditions.

It is well known that wood readily absorbs moisture and conversely moisture quickly evaporates therefrom and in so doing considerable expansion and contraction, respectively takes place in the wood in the direction across its grain i. e. in the directions of the radial extensions of the medullary rays of the wood. It is also a generally recognized fact that the tensile strength and elastic resistance of wood is greatest along the grain in the longitudinal direction of its medullary rays. Longitudinal shrinkage of relatively hard, structural wood ordinarily is so small as to be considered negligible as it normally ranges from about 0.1 to 0.3 of one per cent from green or soaked to oven dry conditions. Further it is a well known fact that edge grained lumber is approximately four times as resistant to wear as flat grain lumber and that good grade lumber for flooring is becoming extremely scarce and nearly prohibitive in its cost.

It has heretofore been suggested that flooring units be prefabricated from relatively narrow pieces of wood of various lengths by disposing said pieces in side by side rows and assembling the pieces in the rows in end to end abutment, and splicing the unit together by longitudinally spaced, metal spiral dowels which are driven into prebored holes formed transversely through the assembled pieces. It has been found however that the material of the wood pieces around the metal dowels quite frequently splits across the wood grain due to the expansion and contraction of the wood in that direction, and in so doing, the material of the wood shrinks away from the dowels thus rendering less effective the dowel connections with the pieces which materially weakens the unit and frequently causes cracks to appear in the major faces of the unit.

It is therefore an object of this invention to provide a driven, wood splicing means for a structural unit of the type described which precludes the splitting of the material of the united pieces around said splicing means and that also provides a means for prefabricating wood flooring units from substantially thinner stock.

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Another object of the invention is to provide a metal connector key for a wood structural unit which is economically manufactured, and that effectively retains the wood pieces in fixed positions in the manufactured unit.

My improved structural wood unit therefore consists of thin metal connector keys adapted to be driven into longitudinally spaced prebored holes of uniform size formed transversely through the assembled wood pieces of a wood panel, said key having a width substantially greater than the diameters of the holes whereby its sides are sunk into the material of the pieces to retain them in fixed positions in the unit. Further the invention contemplates that the keys be so positioned in the prebored holes that their width dimensions are disposed substantially in the direction of the longitudinal extension of the medullary rays in the pieces which would place the keys with their major faces parallel to the major faces of the composite unit. It is also desirable that the grain of the wood pieces be substantially normal to the major faces of the unit so that the edge grain of the wood pieces is presented to the major wearing faces of the unit.

With the above and other objects in view, which will be more readily apparent as the nature of the invention is better understood, this invention consists in the novel features of construction, combination, and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawing and defined in the appended claim.

Referring now to the drawing wherein like reference numerals indicate similar parts throughout the several views:

Fig. 1 is a fragmental, perspective view of a portion of my wood structural unit.

Fig. 2 is a cross sectional view taken on line 2—2 of Fig. 1; a suitable clamp used in manufacturing the unit being shown in dotted lines therein.

Fig. 3 is an enlarged cross section taken on line 3—3 of Fig. 2.

Fig. 4 is a fragmental, perspective view of a connector key for my unit.

Fig. 5 is a fragmental plan view of the stock from which the key may be most economically manufactured.

The embodiment of my invention comprises a number of wood pieces 10 of various lengths that are assembled in side by side relationship in longitudinal rows and which have their ends in abutment in the several rows. Any number of rows of pieces may be employed in fabricating the structural wood unit, but, as illustrated in

Fig. 1, I prefer to use approximately three rows of assembled strips and further employ relatively wide and thin pieces of wood that may have their grains extending substantially normal to the major faces of the unit. With particular reference to Figs. 1 and 3 it will be noted that the wood pieces in the unit have the longitudinal extension of their respective medullary rays 100 directed lengthwise in the pieces and therefore the greatest tensile strength of said pieces lies in said lengthwise directions and only a negligible shrinkage of the pieces or swelling will occur in said lengthwise directions.

The pieces so assembled are held together by a number of longitudinally spaced apart clamps. A suitable clamp for this purpose is illustrated by dotted lines 11 in Fig. 2 and may have a pair of narrow jaws 12 and 13 which clamp the assembled strips between them by means of a screw 14 that has left hand and right hand threads that cooperate with internally threaded lugs 15 and 16 depending from the jaws 12 and 13 respectively. A number of longitudinally spaced, transverse bores 17 of uniform diameter are formed through the assembled and clamped pieces by means of wood drills which may be aligned with the work by suitable jigs, or the like.

A thin connector key 18 preferably made from metal strip stock 19, illustrated in Fig. 5, is driven endwise into each of the bores, and, as illustrated in Fig. 4, each of said keys has a round pilot end 20 formed thereon and an opposed flat driving end 21. The connector key has a width substantially greater than the diameter of the bore into which it is to be driven and as illustrated in Fig. 3 it will be noted that the sides 22 and 23 of the connector key are forced into the material of the assembled pieces which thereby retains the pieces in fixed positions in the unit.

As most clearly illustrated in Fig. 3 the thin connector keys 18 are positioned in the respective transverse bores 17 in the unit with their widths extending in the general direction of the longitudinal extensions of the medullary rays 100 in the wood pieces 10, or, in other words the major faces of said keys are substantially parallel to the major faces of the composite wood unit. Thus the original hold power of the keys, effected by driving them into the bores with their widths extending in the general direction of the longitudinal extension of the rays in the wood pieces, will be retained throughout the entire period of usefulness of the unit, for, the keys cooperate with the characteristics of the wood in that direction and, as has been stated,

the material of the wood in said direction has the greatest tensile strength and elastic resistance and also no appreciable expansive and contractive qualities. Further as the greatest shrinkage and expansion of wood is in a direction across the grain, and the wood pieces 10 in the panels are generally disposed with their grain 24 running heightwise of said panel, contraction and expansion of the wood pieces will occur in both heightwise and transverse directions of the wood pieces, thus the greater component of such movement will be directed substantially vertically in the pieces as they are represented in Fig. 3 whilst a lesser amount of the movement is directed transversely of the unit for the reasons indicated hereinbefore. As the keys are not set in their respective bores in generally vertical positions the material of the wood pieces around the bores is free to expand or contract vertically thus precluding splitting of the wood in said vertical directions around the bores.

In the drawing the grains of the wood pieces have been indicated by the reference numeral 24, and it will be noted that the grains of the wood pieces may all extend substantially normal to the major faces of the unit thereby presenting the grain edge to the major wearing surfaces of the unit to increase the useful life of the unit.

What is claimed is:

A composite structural unit having a plurality of elongate wood boards disposed in parallel rows and assembled in the rows in end to end abutment, the predominant number of said boards having their individual grains disposed substantially normal to the major faces of the unit and all of said boards having the longitudinal extent of their medullary rays disposed substantially lengthwise in the unit, a number of longitudinally spaced bores of uniform diameters formed transversely through the assembled boards, and a thin connector key extending through the central portion of each bore and having its sides wedged into the material of the wood on diametrically opposed sides of the board that lie in a line substantially normal to the grains of the boards.

PHILIP DE ANGUERA.

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