June 5, 1923. 1,457,974

M. HANEMANN

PROCESS FOR MAKING WOOD EVERLASTINGLY FLEXIBLE

Filed April 24, 1920

Fig. 1.

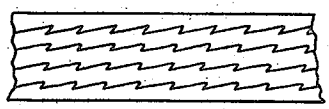
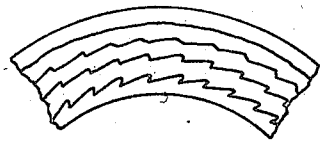


Fig. 2.



Witness:

Inventor:

Patented June 5, 1923.

1,457,974

UNITED STATES PATENT OFFICE.

MAX HANEMANN, OF MUNSTER, GERMANY.

PROCESS FOR MAKING WOOD EVERLASTINGLY FLEXIBLE.

Application filed April 24, 1920. Serial No. 376,427.

To all whom it may concern:

Be it known that I, MAX HANEMANN, a citizen of the German Republic, residing at Munster, i. W., Germany, have invented certain new and useful Improvements in Processes for Making Wood Everlastingly Flexible (for which I have filed applications, Germany, Patent No. 324728 of November 24, 1917; Switzerland, Patent No. 318197 of November 24, 1917; Denmark, Patent No. 24476 of April 24, 1918; England, Patent No. 131128 of August 10, 1918; Italy, Patent No. 170115 of November 29, 1918; Canada, Patent No. 194601 of December 9, 1919; Finland, Patent No. 7213 of February 15, 1919; Holland, Patent No. 5093 of September 30, 1918; Norway, Patent No. 30474 of September 26, 1918; Austria, Patent No. 80815 of August 1, 1918; Sweden, Patent No. 48234 of September 26, 1918; Turkey, Patent No. 3027 of 12th May, 1920; Hungary, Patent No. 77250 of November 23, 1918; Belgium, Patent No. 273613 of July 26, 1918; France, Patent No. 517783 of October 7, 1918; Roumania, Patent No. 5229 of February 21, 1918; Czechoslovakia, Patent No. 6675 of June 10, 1920; and Poland, filed May 19, 1920), of which the following is a specification.

It has long been known that wood could be softened by moisture and heat and where so softened become flexible when in pieces having such proportionate cross sections as to be susceptible of being flexed, but without further treatment such flexibility decreases as the moisture and heat are withdrawn.

It is the purpose of this invention to produce a permanent condition which will cause a lasting flexibility.

To this end the wood after being duly softened by heat and moisture is submitted to pressure endwise of the grain or longitudinal fibres of the wood until such fibres are crinkled or forced into folds or corrugations, and such pressure is maintained until the wood is cool and dry.

In the accompanying drawing in which the figures are diagrammatical illustrations of a longitudinal section of the wood after treatment, the crooked lines indicating the fibres of the wood.

Fig. 1 shows a straight piece of wood with all the fibres similarly crinkled or forced into folds, and

Fig. 2 shows a like piece of wood which has been bent to a curve with the fibres on one side of the longitudinal axis still crinkled, while those on the other side of said axis are to some extent straightened, illustrating how the crinkling of the fibre facilitates bending by permitting the outer or tensioned side of the bend to stretch by the straightening on that side of the crinkled fibres. Obviously this capacity for stretching increases the flexibility of the wood.

Of course the actual susceptibility to bending of a piece of the wood depends in part upon its proportionate cross sections, and this will be determined in great part by the use to which it is to be applied, but my treatment may be applied to lumber either before or after dimensioning for its final use, although in the latter case, of course, there must be provision to prevent the pressure endwise of the fibre from undesirably distorting the shape of the piece of wood being pressed, but there should not be such pressure laterally of the fibres as to cause the crinkled fibres to interlock.

In order to produce the desired pressure any ordinary press may be used, but in order to maintain the wood in the desired condition the moistened and softened wood may be placed between plates arranged across the ends of the fibres and put therewith into the press, and after suitable pressure has been applied the plates may be connected and secured, and with the wood clamped between them removed from the press and set aside until the wood has fully cooled and dried.

I am aware that wood has been pressed or squeezed to flatten it and to express the saps and gums, and to pack its fibres laterally, and possibly its flexibility has been increased, and also that it has been compressed more or less in all directions so as to distort and compact the fibres and cause them to interlace, thus hardening and

toughening it, but without, so far as I am aware, increasing its flexibility.

I claim:—

The process of making wood lastingly flexible, which consists in softening wood by heat and moisture, as by boiling or steaming, and while so softened compressing it endwise of the longitudinal fibres so as to crinkle or corrugate the latter but without distortion of the piece of wood as a whole, or sufficient side pressure to laterally interlock the said fibres.

In testimony whereof I affix my signature in presence of two witnesses.

MAX HANEMANN.

Witnesses:

ERNST EBERT,

MAX MÜLLER.