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BOARD-JOINING PROCESS BY OSMOTIC PLUGS, MORE ESPECIALLY UTILIZED IN LIGHT-TIMBER FRAME-WORK

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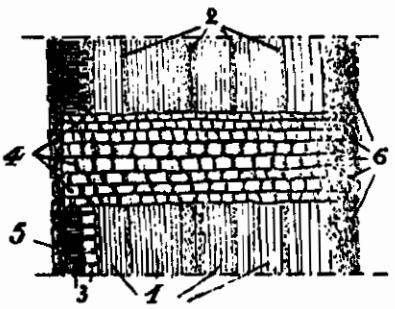


Fig. 1.

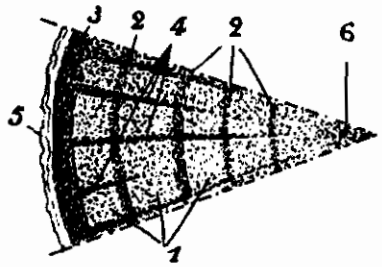


Fig. 2.

Fig. 3

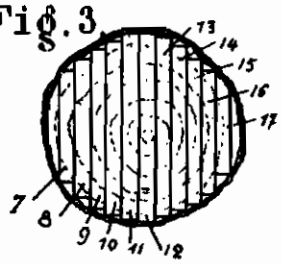
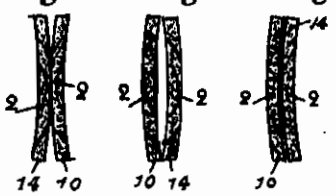


Fig. 4. Fig. 5. Fig. 6.



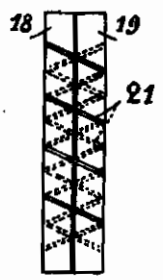


Fig 7

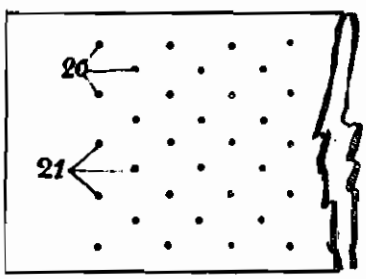


Fig. 8.

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ALIEN PROPERTY CUSTODIAN

BOARD-JOINING PROCESS BY OSMOTIC PLUGS, MORE ESPECIALLY UTILIZED IN LIGHT-TIMBER FRAME-WORK

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Application filed July 8, 1942

The chief object of this invention is to carry out a process by which it becomes possible simultaneously to maintain hygrometric poise in wood together with board-joining, more especially in frame-work and known assemblage of beams, by solely making use of certain plugs of a specific texture and fixing them up in such a way as to replace, first, the medullar system feeding wood through osmotic pressure, and, secondly, all iron-pins, screws or nails that are now utilised to bind up assembled pieces.

The fixing of osmotic plugs being essentially meant to obtain a kind of hygrometric drainage tending to replace the natural process found in live wood.

In order to better understand the characteristics of this invention, the chief elements serving to its fulfilment are shown on the drawings of instructions here-attached.

These drawings are showing, respectively:

Plate No. 1—An elevation-view of a longitudinal section of the elements composing trees in general.

Plate No. 2—Same section in flat.

Plate No. 3—A face-view, on a smaller scale, of a tree trunk and its usual cutting up.

Plates No. 4, 5 and 6—Such deformations, respectively, as may occur in boards cut up from trunk seen on Plate No. 3.

Plate No. 7—A face-view, on a wider scale, of two boards coupled by means of osmotic plugs (main feature of this invention).

Plate No. 8—A side-view of same boards and the grouping of osmotic plugs.

Wood, as one knows, is a fibrous body composed of cells turned into a determined direction by stringy filaments 1, Plates Nos. 1 and 2. These fibres are elongated and running parallel with the axis of the tree, they are disposed into concentric layers 2 of different thicknesses and densities corresponding to various climates, qualities and also to periods of vegetation and of rest. It is owing to these concentric layers that the age of a tree can fairly accurately be determined.

Parallel with the ligneous layers are to be found grooves forming sap ducts 3. The ligneous filaments 1 which constitute the wood itself are in certain parts crossed by an assemblage of directive lines called medullar rays 4: these rays 4 start their course from the bark tissue and converge in the vicinity of the medulla 6 but do not all get as far; they vary in length and thickness according to density of sap; it is also due to them that the wood is kept alive; acting as regulators, they distribute all feeding matter by osmose to fibres and cells, the constitution of which being made of very hygroscopic colloidal matter, that is to say retaining any water whilst ensuring equilibrium by means of atmospheric humidity. But this is no longer the case directly the wood is sliced into boards (7 to 17—Plate 3). At that moment, the medullar rays 4 are cut off and the water is drained to and retained in the fibres, thus causing variations as to shape, density and resistance: the wood swells out and retracts, alteration commonly known as "warping" (as shown in Plates 4, 5 and 6) and always closely following up the incurvations of the ligneous filaments 2 which may truly be compared here to springs.

Alike metal, whenever it be utilised in constructions, wood is likely to warp through tractions or compressions; its mechanical just as its physical properties are different ones, according to whether it is being worked along its axis (wood grain), or transversally (sideway). Consequently, its axle cohesion differs from its transversal cohesion. As a matter of fact, it is easier to separate ligneous fibres lengthwise than transversally, and it could be said, by analogy, that wood is essentially anisotropic.

It is therefore recognized that, in nature, the state of poise of all matter forming the very texture of wood is due to the preservation of its hygroscopic state, as being ensured through the medullar ducts 4 which bring about the osmose feature.

Yet, if two boards, once cut, are being placed one against the other (18 and 19—Plates and 8), and that, in order they should hold fast, minute holes are bored into 20 preferably at various angles, also that, through such tiny holes, plugs 21 the size of a big match stick of tender wood are forced in, a system of drainage by osmose is thus artificially created; further, we find that this will preserve the hygrometric equilibrium within the ligneous fibres 1 of the boards in question, just as would the medullar ducts in nature. In multiplying those plugs 21, there will thus be simultaneously created medullar ducts together with a system of fixture of the highest resistance—(experimentations demonstrated that it is practically impossible to separate two boards assembled thus)—which will enable to utilise such an assemblage with a maximum of both security and convenience; and this process of fixture by plugs 21 will ensure permanent airing of the fibres, whilst recreating as perfectly as possible the necessary cohesion between the boards 18 and 19, without affecting in any way the resistance

(the nerve), all of which considerably increases the coefficient of resistance in case of rupture of a wooden frame-work assembled thus.

Such result, held as being a new one, characterises and justifies this invention. It permits a setting up, with yet more precision, of the foliated wood frame-works patented by the same inventor, devices which already help to adjust, if only partially, certain variations in densities between the elements used, variations which had been found in trees in particular circumstances during growth.

Those partial adjustments are made possible through a juxtaposition of boards of different grains, but which are always held together by metallic parts, cutting in and completely obstructing all circulation through the fibres, and creating points of rupture wherever detents or cuts are made.

Summary

Board joining process by osmotic plugs, more especially utilised in light-timber frame-work, characterised by:

1. Holes bored into boards to be fitted together. These holes of very small diameter are placed at various angles and in opposite directions to each other. It is better to place these tiny slanting perforations in quincunx.

2. Plugs, which must essentially be of more tender wood than that of the boards, are forced into the above-mentioned perforations.

3. Combination and cooperation of the mentioned holes and plugs, in order to constitute an artificial medullar duct to feed the fibres of the boards, simultaneously with a system of fixture and assemblage of the boards treated thus.

JACQUES COUËLLE.