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MATERIALS COMPRISING CORRUGATED WOOD
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Fig. 1.

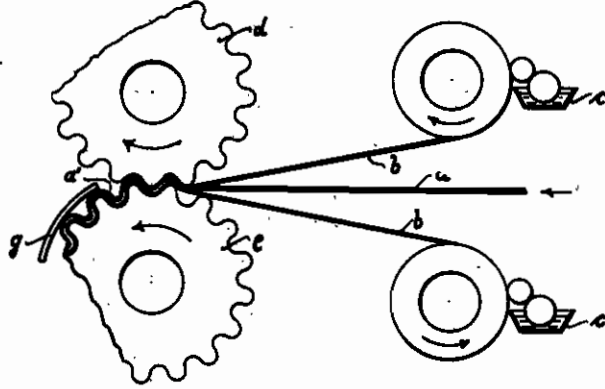


Fig. 2.

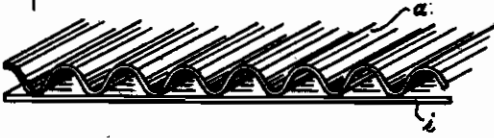


Fig. 3.

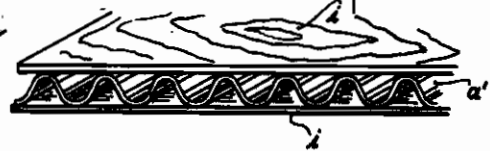


Fig. 4.

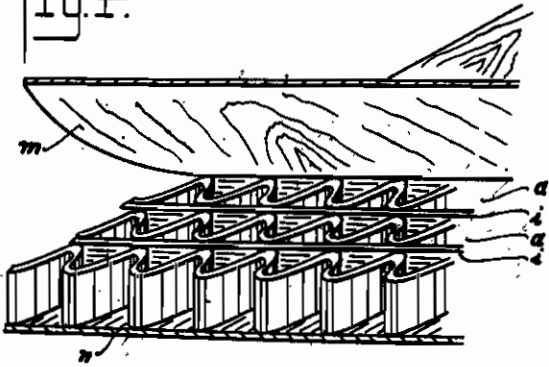


Fig. 5.

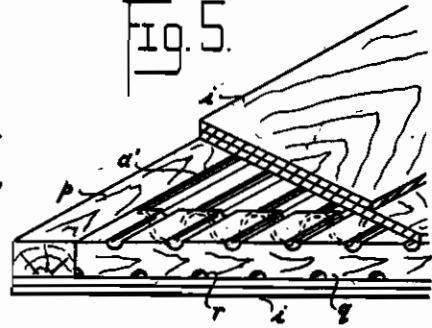
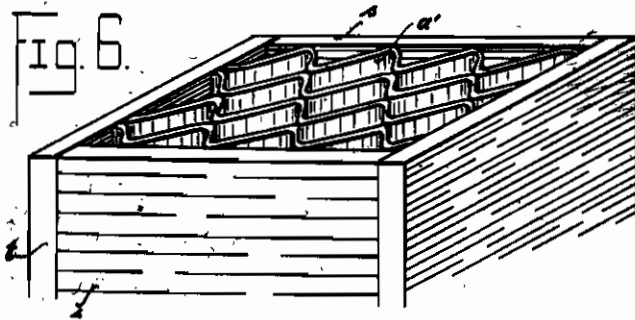


Fig. 6.



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ALIEN PROPERTY CUSTODIAN

CORRUGATED PLYWOOD AND APPARATUS FOR THE MANUFACTURE OF SUCH CORRUGATED WOOD

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This invention relates to corrugated plywood, corrugated wood, manufactured by a particular process, and to apparatus for the manufacture of such corrugated wood.

The corrugated plywood may be defined as follows: the meaning of corrugated cardboard is well known, it is cardboard which is given the shape of waves or corrugated shape and retains it, this being ensured preferably by gluing on to it a flat support or bottom layer also say of cardboard, or a bottom layer and a top layer say of flat cardboard.

It was known to give flat wood webs temporarily a corrugated shape in order to obtain a flexible veneer, but up to now it was not known how to make such wood to keep its corrugated shape. For that reason it was hitherto impossible to manufacture corrugated plywood (corrugated wood).

Experiments of the inventor have shown that this object cannot be attained by giving thin webs of wood corrugated shape in the same way as in the corrugated cardboard manufacture, and by securing the apex of the corrugations to a flat wood web by gluing. Such a material shows a highly undesirable working or warping of the corrugated wood. In spite of the fact that the waves are arranged, of course, parallel to the direction of the grain, in the course of time there takes place an equalization of the tension produced by the corrugation, certain wood portions splinter off, the texture of the corrugated wood is loosened.

These phenomena become more particularly objectionable when it is attempted to saw such corrugated wood, as owing to the said loosening, there is such a splintering that the sawing is rendered quite impossible.

This invention largely avoids these drawbacks, and makes it possible to obtain in a simple manner a corrugated wood similar to the corrugated cardboard, that is to say a light material with excellent and entirely unexpected properties.

The present invention consists in that the preferably freshly stripped thin web of wood, if desired prepared by impregnation with artificial resin components or other, is covered at both sides, that is to say top and bottom, with a thin layer of paper, Metal, fabric or foil of some other artificial material. These covering layers are glued to the wood, preferably with a glue containing silicates or with a silicate as glue. More particularly suitable for the purpose is a glue of sodium-potassium silicate mixed with glucose, carbonate of lime and a fatty oil rendered soluble

in water by sulphonating (see German Patent -----)

This coated web, if desired is further treated with artificial resin components and the like, passes through a fluting roller installation, the parts of which working on the wood are heated. It is preferable to proceed by first putting on the glue in the same machine, and by producing the corrugations before and during the setting. The flat bottom webs or the flat bottom and upper webs are then also glued in the same apparatus to the corrugated web and secured to it by passing the whole over heated surfaces.

The corrugated wood thus produced can then be converted into a "tube plate" by gluing a further flat web on the corrugated side, this tube-plate representing an excellent light plate which can be generally used wherever hitherto one used plywood which is, however, much heavier.

It is even possible to manufacture flexible corrugated wood by arranging the grain of the covering plate parallel to the grain of the corrugated wood. By bending such a plate and placing at the back of its corrugated side another bent wood plate to be glued on, it is possible to manufacture bent "tube-plates", for instance barrels for fruit and the like. If on the contrary the grain of the covering plate is arranged at an angle, preferably at right angle to the grain of the corrugated plate, elastic but not bendable kinds of plywood will be obtained, which have considerable advantages over the ordinary plywood. First of all such plates are considerably lighter than the corresponding plywood plates, and besides they have a much better cold, heat and sound insulating property.

It must be pointed out that for the manufacture of corrugated wood should be used freshly stripped wood webs. This is probably the first process in which freshly stripped wood has to be used.

It must be mentioned that the corrugated web retains its shape even without having a bottom plate glued-on. For instance, the apex points of the corrugated webs can be glued together, a honeycomb-like structure without rectilinear bridges thus being obtained.

Corrugated wood rigid at one side, that is to say corrugated wood in which the grain of the corrugated web is at an angle to the covering plate, is glued in a stack to a single block and sawn at right angles to the stack by means of a circular saw, plates with honeycomb structure being thereby produced. These plates or discs can be used as a central layer, that is to say ac-

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ording to Figure 4, glued to a bottom plate and to a top plate. These wooden plates are called honeycomb corrugated wood-plywood plates.

For fixed dimensions (standard dimensions) round a suitably cut stack of superposed glued-together corrugated wood plates, is glued a wood frame with thick walls. This stack is sawn as described at right angles to the grain of the corrugated wood, and in that way is obtained a framed corrugated wood honeycomb central layer. Such a central layer can be locked with wood, metal, cardboard, and the like.

On rigid corrugated wood being placed in wooden frames of equal height and boring holes in the branches of the wooden tubes, after veneering it at both sides, that is to say after providing it with bottom and top plate, a corrugated wood plate with through air ducts will be obtained as shown in Fig. 5. This plate is more particularly suitable for doors, wall paneling and the like.

The hollow spaces in the plates, more particularly in those with honeycomb structure, may be filled with insulating material such as cork and the like, in loose state, as well as coated with layers of gypsum (with saw-dust), concrete, tar composition, cement, and the like.

Fig. 1 shows diagrammatically an apparatus for carrying out the process for the manufacture of corrugated wood.

Fig. 2 is a section through a corrugated wood plate.

Fig. 3, a tube plate made of corrugated wood.

Fig. 4 a honeycomb plywood plate, and

Fig. 5 a door with solid frame and insertion of corrugated wood with air ducts.

In the aforementioned accompanying drawings, *a* is the wood web, *b* the paper webs, *c* gluers on, *d* fluting roller, *e* fluting roller, *f* fluting roller, *h* corrugated conveyor band, *i* covering veneer, *k* heated table for putting on the bottom plates.

The freshly stripped wood web *a* is introduced for instance with the grain direction parallel to the fluting rollers *d* and *e*, between the fluting rollers *d* and *e*. The two paper webs *b* are introduced simultaneously with the wood web *a*. Before passing through the fluting rollers, the paper webs *b* are coated with glue which is contained in the gluing-on device *c*. The value of the glued-on paper webs is that they protect thin wood webs from bursting and shrinking. Moreover, in the finished corrugated wood, splintering of the wood during sawing is precluded. The action of humidity is also stopped by the paper webs. The sized paper webs make possible a rigid and permanent corrugated shape in order to avoid a tension at the glued point.

The two combined materials are driven by the fluting rollers *e* and *f* as well as by the corrugated conveyor band *h* and the guide wall *g*. The corrugated wood passes on its way the gluing device *c* with the fluting roller where the projections are coated with glue.

The covering or top veneer *i* is introduced when the corrugated wood reaches the vertical point of the conveyor *h*.

The corrugated conveyor band *h* guides and exerts pressure on the glued joints. All the fluting rollers, conveyors and the supporting table are heated in order to accelerate the drying of the wood and the setting of the glue. The covering wood web may comprise two wood grain directions, namely grain directions at an angle to the corrugated wood, this gives a rigid cor-

rugated wood tube plate shown in Fig. 2. If it is desired to produce flexible corrugated wood, then the two grain directions are arranged parallel to each other. Both covering webs the grain direction veneers at an angle to the corrugated wood web, produces a light rigid and insulating plywood plate with air ducts, shown in Fig. 3. Figs. 4 and 5 were already referred to in the foregoing.

The corrugated wood and in the same way the plates to be made from it, with tubes or honeycomb structure, can never become warped, nor does there take place any distortion and sagging of the covering webs, as the glue for securing the covering plates—the veneering—is put on only on the projecting edges of the corrugated wood fluting rollers and of the corrugated honeycomb wood central layers, and not, as otherwise usual, over the whole veneering surface. Among the substantial advantages of the corrugated wood and of light plates manufactured from it, may be mentioned: light weight, good insulating properties and low cost. Of the wide variety of uses may be mentioned: building parts also for tropics, panelling, partitions, furniture making, door making, packing purposes and barrels, light buildings, exhibition stands, film green rooms and building, week-end houses. The saving in wood and, compared to the ordinary plywood, also in glue, is considerable.

It is claimed that the following advantages are achieved by the invention:

a. Corrugated wood from thin freshly stripped wood web, covered with paper, metal foil and the like, glued say with the aid of silicates or artificial resin-containing glues, corrugated parallel to the grain, with drying of the glue, if desired impregnated with artificial salt and the like.

b. Corrugated wood unit according to *a* with a glued-on flat wooden plate with grain arranged parallel or at an angle to the grain of the wood, or with a plywood plate with gluing of the contact lines.

c. Tube plates of corrugated wood according to *b*, with the corrugated open sides also covered with a flat plate, if desired a plywood plate, the corrugations glued together at the lines of contact, if desired with a frame of solid wood glued on.

d. Honeycomb wood plate from a stack, if desired framed, of superposed glued together layers, flat plate—corrugated wood—flat plate—corrugated wood, etc. also superposed and glued together layers of corrugated wood, the stack being cut into discs and flat wood or plywood plates being glued on the cut open sides, the gluing being done at the points of contact.

e. Honeycomb wood plate as *d*, obtained out of a single stack of: flat plate—plurality of corrugated plates—flat plate.

f. Building plates according to *a* to *e* with the substitution for the flat wood plates, of plates of other material such as cardboard, artificial resin, artificial resin board; insulating material, Fig. 5 metal, etc. but with intermediate layers containing corrugated wood.

g. Building plates according to *b* to *f* with filling of the hollow spaces with insulating material such as cork and the like.

h. Apparatus for the manufacture of corrugated wood with covering, if desired with simultaneous gluing-on of a flat web, as diagrammatically illustrated and described.

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