

K. MUTTER.
 VENEER STRUCTURE.
 APPLICATION FILED OCT. 24, 1912.

1,058,701.

Patented Apr. 8, 1913.

Fig. 1.

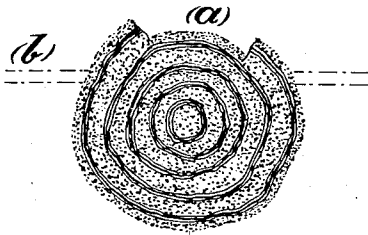


Fig. 2.



Fig. 3 und 3a.



Fig. 4.

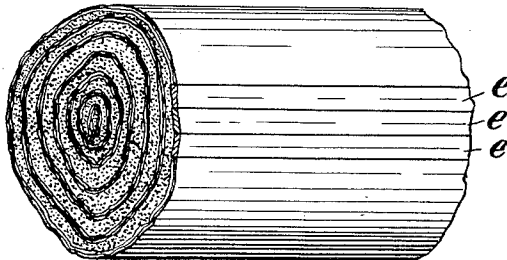


Fig. 5.

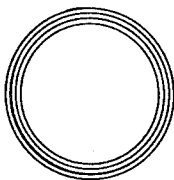
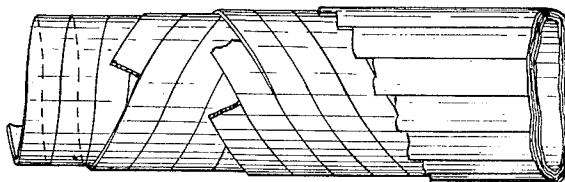


Fig. 6.



Witnesses:
 G. Hedemeier.
 E. A. Fring

Inventor:
 Karl Mutter;
 by Macmillan, Attys.

UNITED STATES PATENT OFFICE.

KARL MUTTER, OF GÖRWIHL, GERMANY.

VENEER STRUCTURE.

1,058,701.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed October 24, 1912. Serial No. 727,475.

To all whom it may concern:

Be it known that I, KARL MUTTER, a citizen of the German Empire, and residing at Görwihl, Baden, Germany, have invented certain new and useful Improvements in Veneer Structures, of which the following is a specification.

My invention relates to improvements in rods, tubes, blocks and the like composed of superposed, glued bands of veneer.

It has already been proposed to manufacture bodies having great strength, combined with small weight and small cubical contents by gluing together layers of veneer laid crosswise one over another, and then pressing them together. In this manner are produced blocks, plates and the like, which can be by suitable means manufactured into the desired objects, or by employing suitable formers the layers of veneer can be so arranged one above another that rods, tubes, vases or objects of other forms, are directly obtainable. It has moreover already been proposed to employ for these known processes veneers obtained by removing on a lathe spiral layers from the trunk of a tree. The veneers thus obtained have greater strength than those obtained in the usual manner *i. e.* by dividing the trunk segmentally (as *b* in Figures 1 and 2), because when removing spiral layers from trees of regular growth the various cohesive annual rings are less frequently cut through.

If there be removed from the trunk of a tree, *e. g.* a coniferous tree, a strip forming portion of a single annual ring (see *a* in Figs. 1 and 3), and if this strip be examined, it is readily seen that the wood in one and the same annual ring is not homogeneous throughout. Each annual ring is found to consist of two layers, the one being throughout its structure not only comparatively soft and porous and therefore of little strength, but also highly hygroscopic, while the other, though occupying less space is remarkably dense, of great strength, and, owing to the high percentage of rosin present, is practically non-hygroscopic. The first-named layer of the annual ring forms during the spring and will hereinafter be called spring-wood, the latter layer forms in summer and will be therefore called summer-wood.

According to my invention the veneer is first removed from the trunk in layers exactly parallel with the annual ring (see *a* Figs. 1 and 3) and preferably in the form of

strips (*e*, Fig. 4); thereupon the soft spring-wood (as indicated in the drawing by the dotted portions of the sections) is peeled off from the hard summer-wood (as indicated by the full lines in said sections) leaving a veneer as *a'* in Fig. 3^a. It is from such a veneer that I make the said rods, tubes, blocks and the like.

I have found that objects manufactured from veneers consisting only of the thin, hard summer-wood, even when such objects are of considerably less weight and occupy considerably less space, have remarkably greater strength and rigidity than objects manufactured by the said known processes.

My invention further makes possible the employment of those woods of a porous nature which have hitherto been inapplicable to the more useful purposes, and hence many cheap kinds of wood can be utilized for making objects having the advantages just described. Moreover hitherto in a great number of varieties of wood the only portion within the trunk which could be employed for a large number of purposes was the so-called heart-wood, which, because more central, was older and capable of offering greater resistance. According to my invention however the new, external wood, that portion consisting of the less resisting annual rings, *i. e.* the so-called sap-wood, can be utilized by removing therefrom all but the summer-wood.

In known processes of manufacturing rods and the like from the ordinary veneers, the pores of the layers of spring-wood, so thoroughly absorb the glue that considerable increase of weight results without a corresponding increase either of strength or, since the glue is hygroscopic, of imperviousness to moisture. As objects so manufactured will naturally alternately get dry and then again absorb moisture, they will not only become warped but, owing to the decomposition of the sap present in spring-wood, especially in the cheaper kinds, will eventually become rotten and perish.

The veneer *a'* consisting entirely of summer-wood is naturally saturated with rosin and therefore absorbs practically no glue when the strips of veneer are glued one above another, so that when a strong pressure is applied to the superposed layers of veneer almost all the glue is squeezed from the intervening spaces and only a thin interposing layer of glue remains. The objects

manufactured according to my invention are therefore quite unaffected by variable hygroscopic conditions, do not warp and have practically unlimited durability.

5 Figs. 5 and 6 show the manner in which tubes are manufactured by superposing and gluing together layers of my novel veneer. In the example illustrated the wall of the tube is formed of four layers of this veneer,
10 a portion of the layers being in Fig. 6 shown cut away for the sake of clearness. The inmost layer is wound like a single screw-thread, the next two layers being wound like multiple screw-threads, the one a left and
15 the other a right hand thread; the outer layer consists of strips of veneer running longitudinally.

Owing to their great strength, light weight and non-hygroscopic qualities, the
20 rods, tubes and the like made according to my invention are specially suitable for such purposes as building up the ribs of aeroplanes, the cars of air-ships and the like.

I claim:—

25 1. Veneer structures, consisting of layers

of veneer composed entirely of summer-wood, said layers being arranged one above another, and glued one to another under pressure.

2. Veneer structures, consisting of layers 30 of veneer formed of longitudinally disposed strips composed entirely of summer-wood, said layers being arranged one above another with the strips in adjacent layers crossing one another, and being finally glued one 35 to another under pressure.

3. Tubes consisting of a plurality of annular layers of veneer composed entirely of summer-wood, said layers being arranged one above another, each layer consisting of 40 strips wound spirally, the strips in adjacent layers crossing one another and being glued together under pressure.

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

KARL MUTTER.

Witnesses:

GEO. GIFFORD,

ARNOLD ZUBER.