

May 9, 1933.

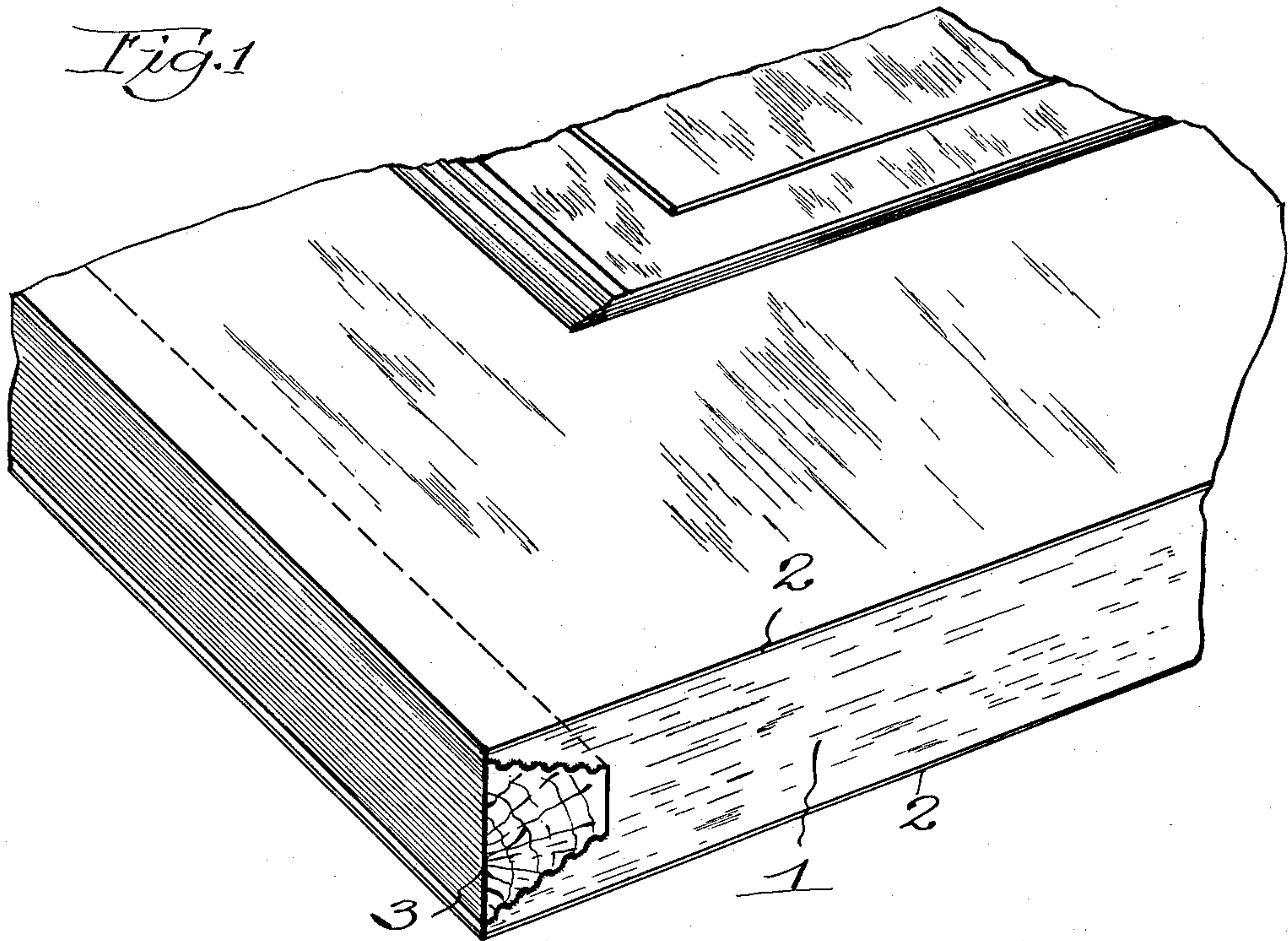
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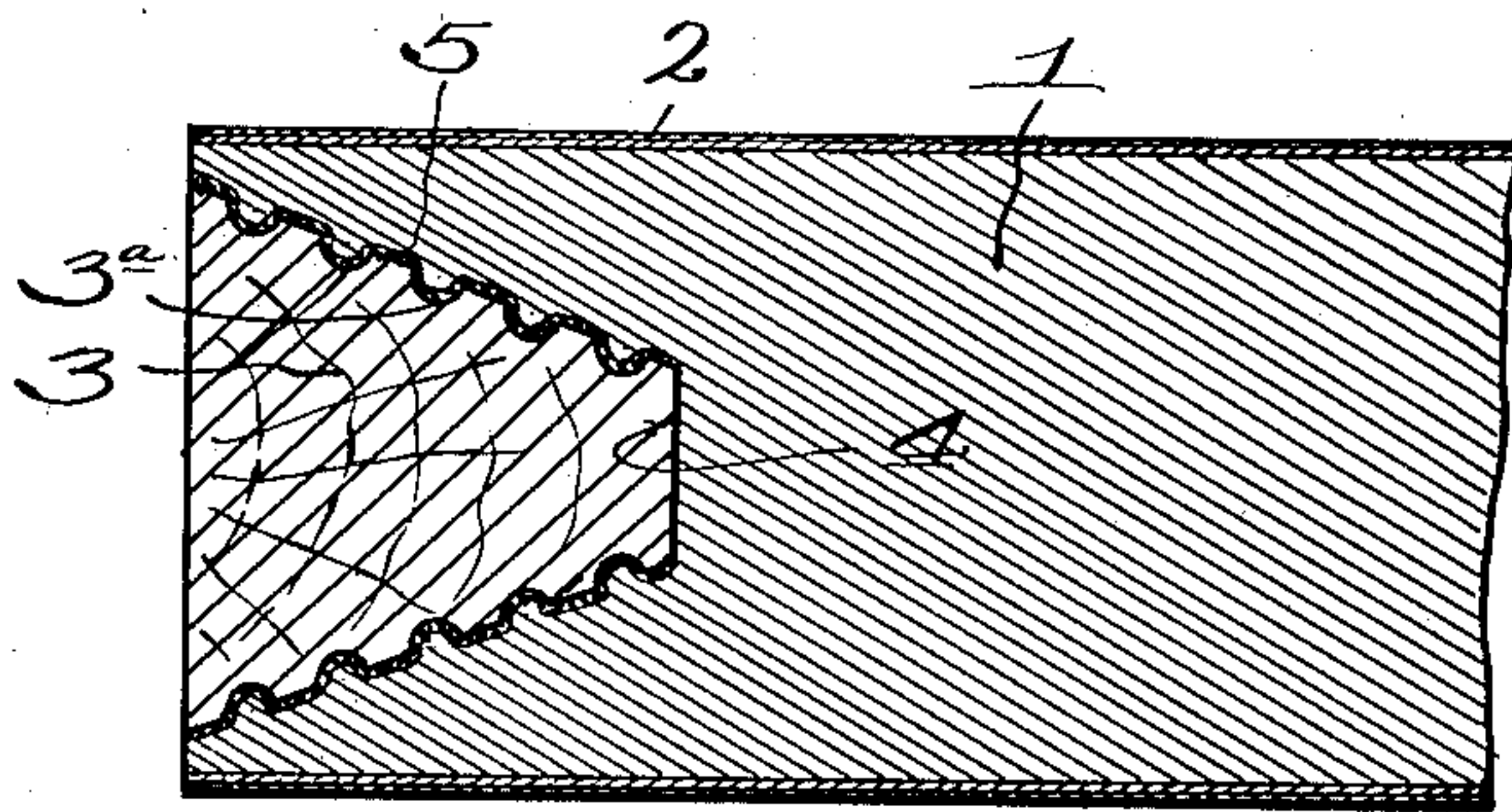
DOOR OF COMPOSITE FIBROUS CONSTRUCTION

Filed May 10, 1930

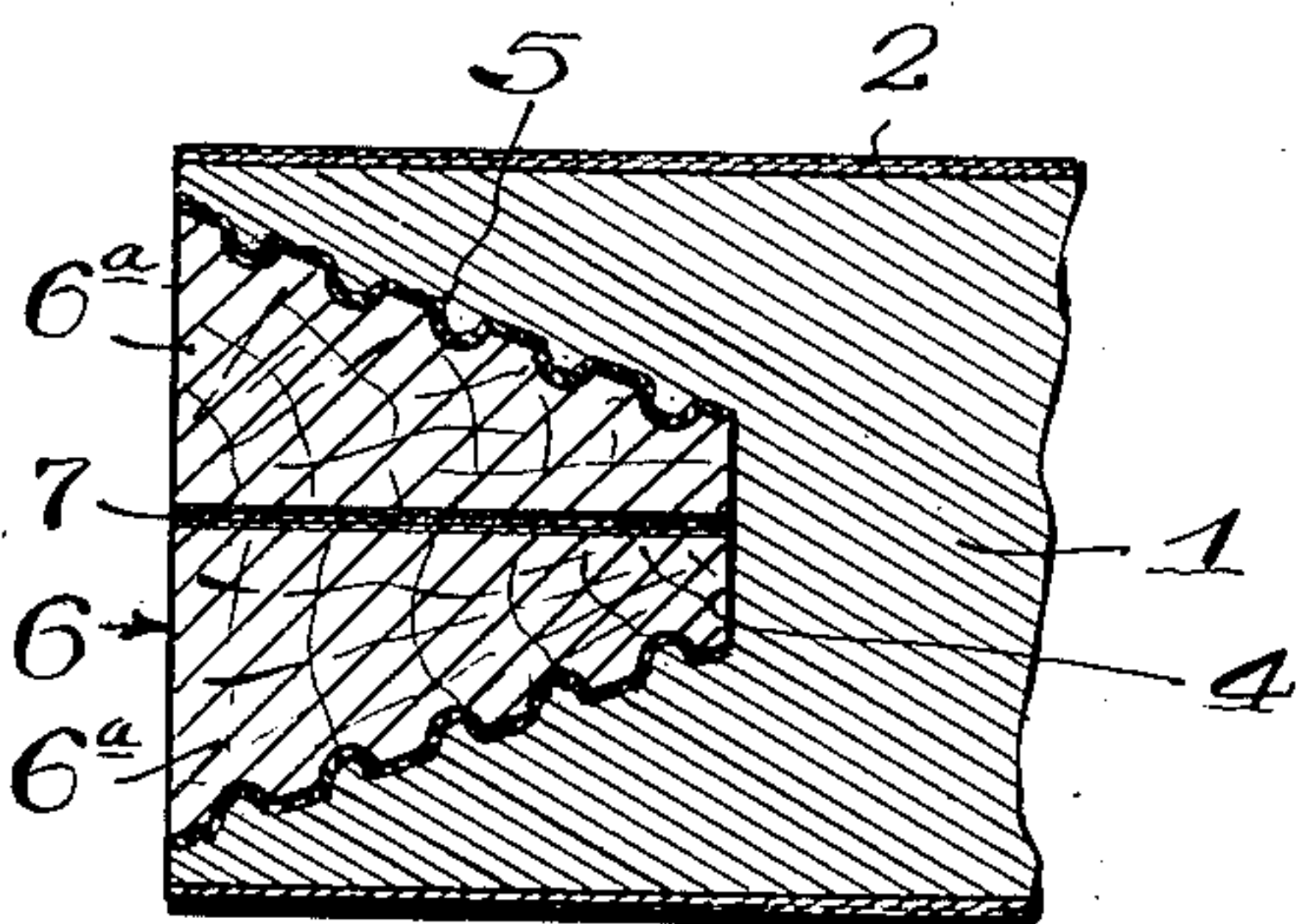
*Fig. 1*



*Fig. 2*



*Fig. 3*



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## UNITED STATES PATENT OFFICE

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## DOOR OF COMPOSITE FIBROUS CONSTRUCTION

Application filed May 10, 1930. Serial No. 451,240.

This invention relates to improvements in doors and like products made from composite fibrous materials other than wood, and more particularly to doors having a base of a compressed cellulose fibrous composition.

In previous applications filed by me, as for instance Serial Nos. 377,917 and 377,918, filed July 12, 1929, the general method of manufacture of doors of this general type is fully described. Again in an application bearing Serial No. 336,387 filed January 31, 1929, a method was disclosed whereby the edges of such doors could be treated so that hardware could be readily applied and screws made to hold in the fibrous base as readily as in wood.

It appears, however, that builders have not yet been willing to admit the entire practicability of a composite door, chiefly because the present method of hanging doors requires more or less trimming in order that they shall fit perfectly in the frame, whereas a composite door is preferably made to fit a frame without trimming and fitting.

The present invention is, therefore, in the nature of a concession to methods still in vogue, and its object is to provide a composite door construction which will include sufficient wood along the edges to permit a certain amount of trimming and also afford a wood anchorage for the hardware.

The method of accomplishing this end, however, is something more than merely embedding strips of wood along the edges of an otherwise solid slab of compressed fibrous material, since it is essential that it be done without their presence being noticeable in the surface finish. Moreover, the wood strips are embedded in the fiber base during the process of compressing it to its final thickness, and since the wood is of a greater density than the fiber, provision must be made to compensate for this inequality.

The reasons for and method of overcoming the problems attending the accomplishment of the results sought, will be clearly understood from the following discussion in connection with the accompanying drawing, in which

Figure 1 is a perspective view of a corner

section of a panelled door of composite fibrous construction, showing a wood strip embedded along one edge;

Figure 2 is a cross-sectional view through the edge having the embedded strip; and

Figure 3 is a cross-sectional view similar to Figure 2 showing the treatment of the embedded strips where hard wood is used.

To briefly describe the process of manufacture of the door, but without reference to the embedding of the edge strips, the base material as already stated is a cellulose fibrous substance such as cornstalk fiber. This material is prepared as a pulp, and is then formed in a partially compressed mat of the length and width of the door to be made, but of considerably greater thickness. This mat is artificially dried, and then coated with a bakelite or other resinous varnish which is allowed to dry until the solvent has been driven off. Over the surfaces of the mat is laid one or more layers of paper which has been previously impregnated with bakelite or like varnish and also dried. The number of layers and the kind of paper used depends on the surface finish.

For a plain door to be painted, a layer or layers of kraft paper are employed, but where the surface is to be in imitation of a grained hard wood, the outer layer is a thin paper printed and colored to imitate the wood being reproduced. If desired, a filler of wood flour and pulverized bakelite or resin may be sprinkled over the surfaces and between the layers of paper. The materials having been assembled are then placed in a press, equipped with die plates or platens so constructed that heat may be applied to the surfaces of the material. Thus by the application of pressure and heat the mat is compressed to its final thickness and density and the layers of paper become an integral part of the structure by the fusing and subsequent hardening of the bakelite or resin, thereby producing a hard wear-resisting surface, aside from having the appearance of a polished hardwood finish. Beyond this it is not thought necessary to go into detail as to the general process of manufacture.

Considering now the addition of natural



wood strips, it is necessary to mention that provision is made for them in the formation of the mat by forming grooves or rabbets along the edges which, for the purpose of this disclosure, may be confined to the vertical edges of the door, although of course they can be provided on all edges if desired.

Thus as shown in Figures 1 and 2, the base or foundation 1 of the door is composed of the highly compressed and dense cellulose fiber, and the outer covering sheets 2, 2 are made up of one or more layers of paper treated in the manner already described, and preferably having a natural wood or grained surface finish. Along the edges are embedded solid strips 3, 3, in this instance of a soft wood such as pine or gum-wood. These strips are preferably wedge-shaped in cross-section contour, that is, tapered inwardly from their outer edges which lie substantially flush with the edge faces of the door, and have approximately the same width.

As a consequence, therefore, the base is grooved along its edge as at 4 in somewhat the same shape as the cross-sectional contour of the strip. Moreover, the beveled faces of the strips are provided with a series of parallel rounded grooves 3a which serve to unite the parts together as will presently be seen. Before placing the strips into the grooves provided in the mat, their surfaces are coated with bakelite or other resinous varnish, and allowed to dry, and then covered with a layer of the filler composed of a mixture of equal parts of wood flour and pulverized bakelite or resin. This filler adheres readily to the surface of the strips rendered tacky by the partially dried coating of varnish, and thus forms a layer 5 of appreciable thickness which eventually serves as a binder and also as a resilient or yielding body between the wood and fibrous surfaces.

The wood strips 3, 3 are inserted into the grooves 4 in the edges of the fibrous base in the course of assembling the materials which are finally subjected to the pressure and heat treatment already described.

Now, the strips, although of a soft wood, are manifestly less resilient than the fibrous base material, and hence greater resistance to compression occurs along the edges than elsewhere. Thus if the strips were rectangular in section and approximated the thickness of the base, there would be visible along the edges of the door faces a band showing a different surface finish and clearly indicating the areas which were subjected to the increased pressure, due to the presence of the less compressible strips. But by tapering the strips inwardly from their outer edges, the proportion of wood to fiber along the edges increases gradually toward the outer edge, and hence the variation in the resistance to the pressure is not apparent on the surface. Moreover, the layer of filler between the sur-

face of the strips and the fibrous material serves to compensate for the decreased compressibility of the wood strips and to absorb any expansion that the strips may undergo after the pressure has been relieved. So, too, the grooved surface of the strips serves to lock the materials together and prevent the strips from being displaced during the application of the pressure.

In case the edge strips are made of hard wood, and therefore less compressible than soft wood, it is desirable to follow the method shown in Figure 3, namely, by cutting the edge strip 6 into two sections 6a, 6a along a transverse median line, and inserting a layer 7 of a suitable cushioning material between the sections. This layer preferably consists of narrow strips of bakelitized paper separated by thin layers of the same filler used in coating the beveled faces of the strips. In this manner the intermediate layer acts as a cushion to absorb the pressure exerted upon the relatively non-yielding strips of hard-wood.

Thus with the wood strips embedded in the edges of the door, they may be sawed or planed down, if necessary, to fit them properly in their frames and to permit hardware to be applied with a wood body which can be mortised, and provides an anchorage for the screws. In a word, the advantage of this method of manufacture as well as the resulting product is a door which is practically of a fibrous or composite construction but with wood strips along the edges to meet the requirements herein pointed out.

I claim as my invention:

A door construction comprising a base of compressed fibrous material, and strips of natural wood embedded in said base flush with predetermined edges thereof, said strips being wedge-shaped in cross-section and tapering inwardly from said edge to a substantial screw anchorage depth, their tapered surfaces being provided with grooves for holding the same against displacement.

Signed at Dubuque, Iowa, this 6th day of May 1930.

EMIL C. LOETSCHER.