

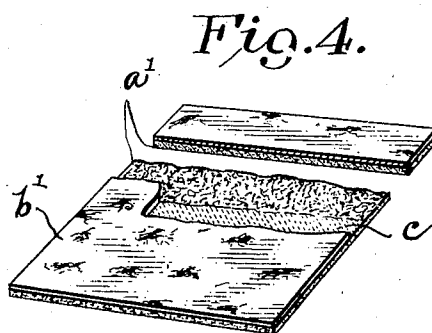
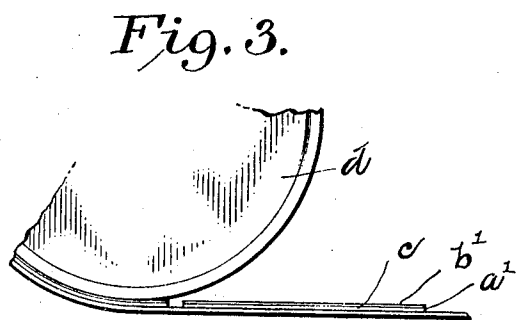
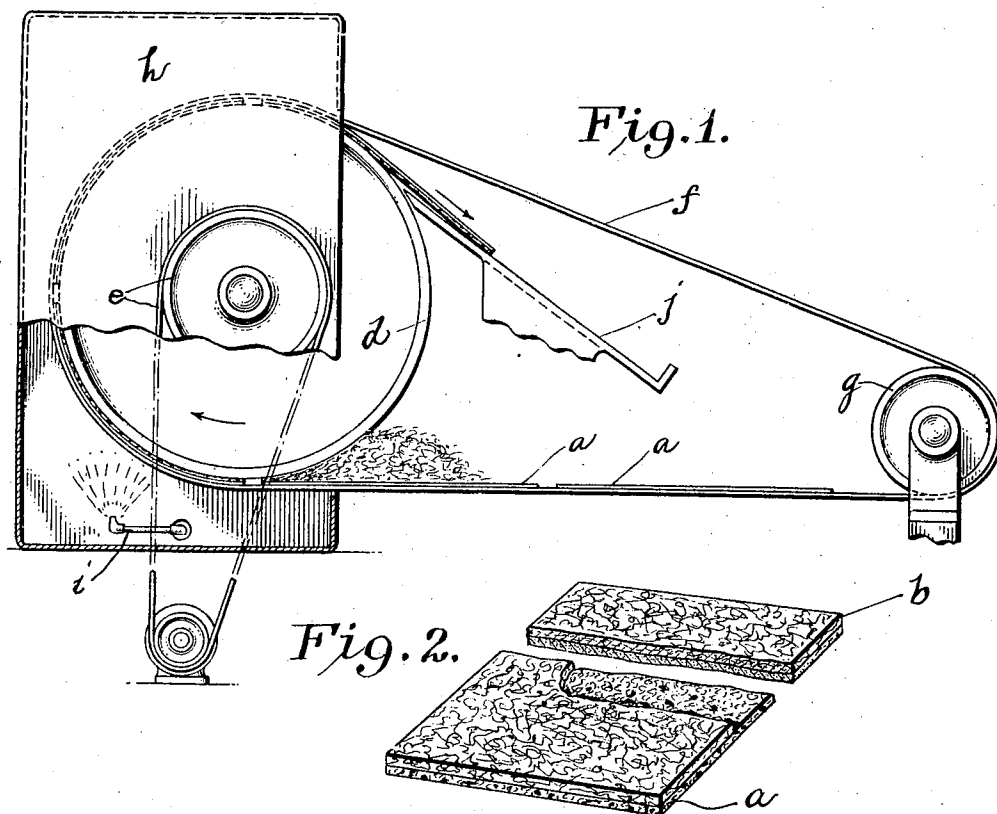
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LAMINATED CORK SHEET AND THE METHOD OR ART OF MAKING SAME

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UNITED STATES PATENT OFFICE

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LAMINATED CORK SHEET AND THE METHOD OR ART OF MAKING SAME

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My invention relates to a laminated cork sheet consisting of a back of composition cork consisting of granules of cork having a thin coating of adhesive or binder, and a face permanently bonded thereto, consisting of natural cork without any additional matter, and the manner of permanently uniting the back with the face by a continuous operation.

Composition cork is used largely in the arts at the present time for the cushion disks for bottle caps of various kinds. This composition cork is formed of cork granules firmly bonded together by means of an adhesive or binder, which in liquid form is applied in a very thin coating to the cork granules, a mass of such coated granules being packed in suitable molds, and under considerable pressure, and subjected to a baking or vulcanizing step to ensure the desired uniform density in the product, and give the desired permanence to the bond between the granules as a result of the proper conditioning of the adhesive so that upon subsequent cooling, it will set. In most instances, the molds in which the cork composition is thus compacted and vulcanized or baked, have a circular mold cavity so as to produce rods of composition cork of a diameter suitable to permit the rods to be sliced into disks, although, in some instances, sheets of composition cork were formerly made and disks cut therefrom.

While composition cork disks are used in bottle closures to a greater extent than disks formed of natural cork, with some beverages the natural cork disks are preferable since such beverages have constituents which may, in time, attack the binding medium and cause discoloration or decomposition of the composition cork. Some bottlers also prefer to use natural cork disks.

With the above conditions in mind, I have produced a laminated cork sheet one face of which is of natural cork, thus securing all the advantages of natural cork disks with the added resiliency of the cork composition, said cork composition disks being relatively more resilient than natural cork disks of the same thickness. The natural cork, being permanently bonded to a relatively thicker back of composition cork, imparts to the product all

of the desirable characteristics of natural cork disks, so far as the action of the contents of a bottle thereon is concerned, and permits a more effective sealing of the neck of the bottle with the same degree of pressure exerted by a crowning machine in applying a cap to the bottle.

The face of natural cork may consist of either what is known as cork wool, the shreds of which are bonded together and to the back of composition cork by the resinous or other cementitious constituents of the cork bark, or of thin sheets of natural cork firmly cemented by means of a stratum of adhesive or binding material to the back stratum of composition cork.

Whether the face be made of cork wool or sheet cork, I have found it essential, in order to secure a product having the desired properties of being substantially integral as to all of the constituents of the sheet, to subject the constituent parts to heavy pressure and to an elevated temperature while binding them together, it being understood that irrespective of the character of the face, the back consists of previously packed and baked or vulcanized, composition cork sheets. The heavy pressure applied simultaneously with the application of heat, will bring the two dissimilar cork product laminæ into the desired intimate relation, conform the contiguous faces of the two laminæ and secure the permanent anchoring of one of these laminæ to the other, either through the medium of the stratum of adhesive or binding, or through the expression and setting of the natural adhesive inherent to cork when the cork wool is used.

While the product referred to in my present application is essentially in sheet form, it is apparent that when it is once cooled it may be cut into any desired configuration either for use as cushion disks in bottle caps, packing gaskets, or other purposes where it may be desired to protect one face of the article by means of a stratum of natural cork.

The invention consists in a laminated cork sheet embodying therein a backing stratum formed of granules of cork bonded together by a thin coating of binder or adhesive, and

a facing stratum consisting of a compacted shredded natural cork wool having the shreds thereof bonded together by cementitious material inherent to the cork, the contiguous surfaces of said backing stratum and said facing stratum conforming accurately one to the other, and being firmly bonded together by an adhesive; and in such other novel features and characteristics, and in the novel steps and practices of producing the sheets, all as hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a view illustrating the method of producing a laminated cork sheet embodying my invention, and directed more particularly to the use of cork wool in forming the facing laminae;

Fig. 2 is a perspective condensed view of a sheet embodying my invention with a portion of the facing lamina broken away;

Fig. 3 is a fragmentary view corresponding to Fig. 1, illustrating the method employed when using a facing sheet of natural cork; and

Fig. 4 is a view similar to Fig. 2, illustrating the product when a cork sheet is used for the facing laminae.

Like letters refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings, *a* indicates the backing stratus of a laminated cork sheet, this backing stratum consisting of a sheet of composition cork cut from a slab formed of a compacted mass of cork granules each having a thin coating of adhesive or binder, the compacted mass while still under compaction having been subjected to an elevated temperature in a baker or vulcanizer in the usual and well known manner, to secure the proper conditioning of the adhesive or binder and uniform density of the material of the slab and of sheets cut therefrom. This sheet is slightly under one-tenth of an inch in thickness, when it is used for cushion disks for bottle closures, although it may vary in thickness according to the use to which the laminated material is to be put. This backing stratum *a* is provided with a facing stratum *b* consisting solely of natural cork firmly cemented or bonded to the backing stratum *a* in a manner to cause the adjacent faces of the laminae *a* and *b* to conform exactly one with the other so as to have a continuous uniform bonding action and permit the separation of the sheet into smaller pieces without possibility of having any looseness at the edges at the line of demarcation between said laminae *a* and *b*.

In the form of the invention shown, in Fig. 1, the laminae stratum *b* is shown as being formed of so-called cork wool or thin shavings of cork, it having long been known that

such cork wool when subjected to the proper pressure in the presence of heat, will readily combine into a homogeneous mass as a result of the expression of the cementitious matter therein, ordinarily resinous in its nature.

This natural cement inherent to the cork wool will serve to bond the cork fibres of the cork wool firmly together and will also bond the resulting sheet or lamina to the backing *a*, the facing thus produced consisting solely of the natural constituents of cork wool. If desired, however, the face of the stratum *a* may have a thin coating of adhesive applied thereto before the application of the material for the facing stratum *b* thereto.

Referring to Figs. 3 and 4 of the drawings, the laminated sheet has a backing *a'* identical with the backing *a* shown in Figs. 1 and 2. The facing strip in this form of the invention, however, consists of a thin sheet of natural cork *b'* secured in relation to the backing *a'* by means of a stratum of cement *c*, which stratum however, is very thin in order to secure the desired bonding of the backing *a'*, and facing *b'* without any appreciable separation of one from the other by the bonding medium. In fact, since the two laminae are united under considerable pressure and heat at an elevated temperature, the adhesive stratum *c* will ordinarily be forced to well within the exposed portions of the adjacent surfaces of the laminae *a'* and *b'*, and will not be apparent in the finished product.

Irrespective of the materials used, the manner of producing the sheet is such that both faces thereof will be smooth and free from voids or pits, the method of manufacturing being such that the two laminae, as to their contiguous surfaces will closely conform one to the other with the two-fold effect of eliminating surface irregularities in either, and securing a substantially integral laminated structure possessing a high degree of resiliency.

It is to be noted that when the backing *a* or *a'* is sliced from previously made slabs, almost the entire exposed surface thereof will be of uncoated natural cork, although there will be very minute, practically invisible lines of demarcation between different granules, which will consist of the adhesive or binder, and there may be exposed at points, the coated surface of some of these granules.

The herein described method of producing a laminated cork sheet embodying my invention, consists in applying to the surface of a cut sheet of composition cork, a stratum of natural cork either in the form of cork wool or a thin sheet of natural cork and passing the composition cork sheet with the surfacing material in contact therewith, between two converging members and while said strata are thus subjected to pressure from said members, passing them through a heated area.

In the form of the invention shown, one of

these members is shown as a wheel *d* continually rotated at low speed by the belt and pulley mechanism *e*, and an endless metallic belt *f* passing about the wheel *d* and about a wheel *g*. The heated area is shown as a chamber *h* heated by means of gas jets or in any other desired manner, as shown at *i*, it being necessary to raise the temperature within the chamber *h* to approximately 220–240° F. The lower reach of the metallic band *f* is substantially horizontal to permit an operator to place the sheets *a* or *a'* thereon; the slow traverse of the belt *f* and low angular speed of the wheel *d* affording ample time for the operator to apply adhesive to the stratum *a* or *a'*, and properly apply or distribute the cork wool forming the stratum *b* or the cork sheets forming the stratum *b'* to the sheets *a'*, and at the same time permits the application of heat and pressure for an interval sufficient to properly condition the adhesive and secure the desired bonding action prior to the discharge of the completed sheet.

As the composite or completed sheets pass upon the shelf *j*, they are subjected to normal temperatures, 70 to 80° F., so as to permit the bonding medium, whether a separate adhesive or an adhesive expressed from the cork wool, to effect the bond between the different strata of the completed product.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A laminated cork sheet embodying therein a backing stratum formed of granules of cork bonded together by a thin coating of binder or adhesive, and a facing stratum consisting of compacted, shredded natural cork wood having the shreds thereof bonded together by cementitious material inherent to cork, the contiguous surfaces of said backing stratum and said facing stratum conforming accurately one to the other, and being firmly bonded together by an adhesive.

2. The herein described method or art of making laminated cork sheets consisting in progressively subjecting succeeding portions of a lamina comprising composition cork sheet, and a surface lamina of natural cork, to the simultaneous application of heat and pressure, whereby said laminae will have their contiguous surfaces brought into accurate conformity, and firmly bonded together and finally relieving the pressure thereon while subjecting the sheet to a normal temperature.

3. The herein described method or art of making laminated cork sheets consisting in applying to the surface of a cut sheet of composition cork, a thin stratum of natural cork, passing the superimposed strata between two converging members, thereafter passing said members with the superimposed strata held under pressure therebetween,

through a heated area, and finally relieving the pressure thereon while subjecting the sheet to a normal temperature.

In witness whereof I have hereunto affixed my signature, this 31st day of March, 1924.

CHARLES E. McMANUS.

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