

June 12, 1923.

G. O. COOMBS

1,458,918

COMPOSITE FABRIC

Filed May 5, 1921

2 Sheets-Sheet 1

Fig. 1

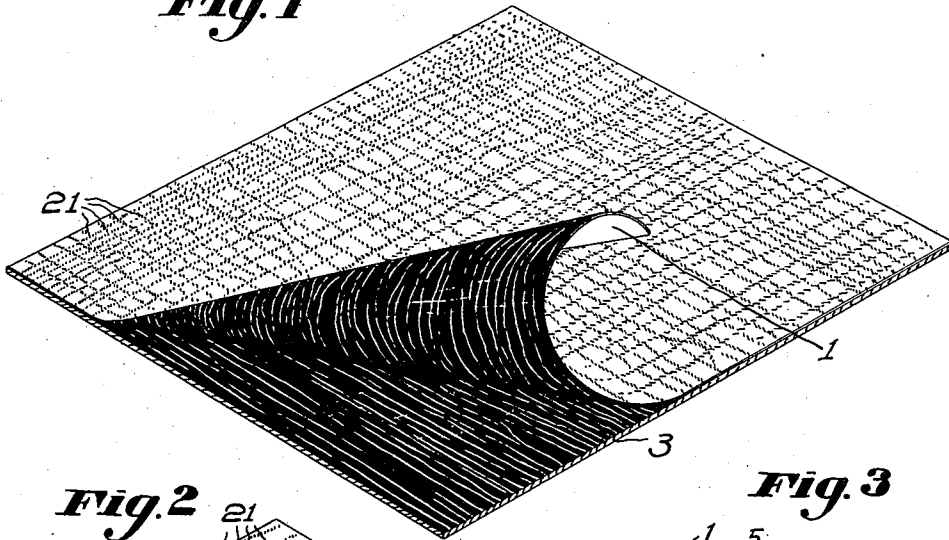


Fig. 2

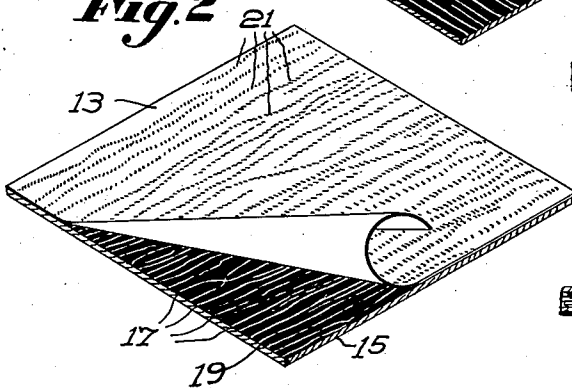


Fig. 3

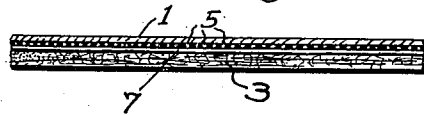


Fig. 4

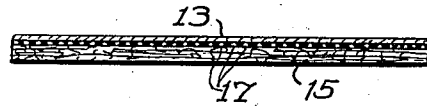
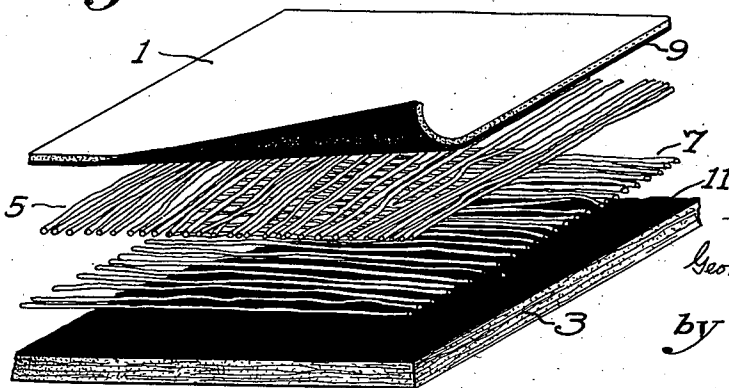


Fig. 5



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2 Sheets-Sheet 2

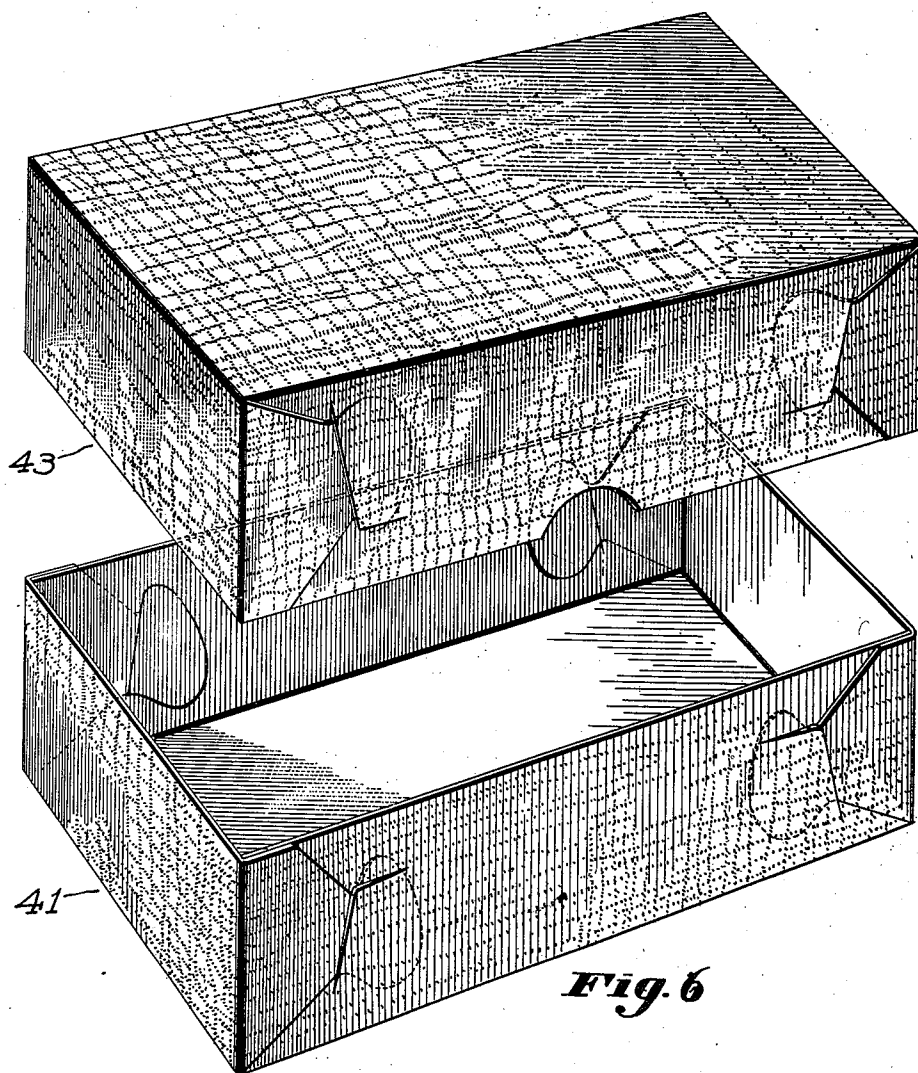


Fig. 6

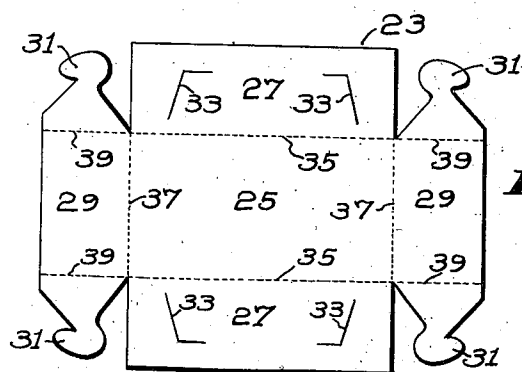


Fig. 7

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UNITED STATES PATENT OFFICE.

GEORGE OTIS COOMBS, OF PROVIDENCE, RHODE ISLAND.

COMPOSITE FABRIC.

Application filed May 5, 1921. Serial No. 466,887.

To all whom it may concern:

Be it known that I, GEORGE O. COOMBS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented an Improvement in Composite Fabrics, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described, relates to a composite fabric stiffened and reinforced by filaments and adapted for making boxes and containers or other packaging purposes.

One of the purposes of the invention is to provide a composite fabric having a layer reinforced by strengthening fibres or filaments and having a relatively thick stiffening layer which may be of cheap material with a stiffness sufficient to enable a box or container formed thereof to stand up without collapsing.

The character of the invention will be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:—

Fig. 1 is a perspective view of one form of composite fabric embodying the invention, having a portion pulled outward and backward to disclose the internal construction of the fabric;

Fig. 2 is a perspective view of another form of the composite fabric having a portion pulled outward and backward to disclose the internal construction thereof;

Fig. 3 on an enlarged scale is a transverse section through a portion of the fabric shown in Fig. 1;

Fig. 4 on an enlarged scale is a transverse section through a portion of the fabric shown in Fig. 2;

Fig. 5 is a perspective view of the fabric shown in Fig. 1, having the layers and reinforcing filaments segregated to facilitate understanding of the relation thereof;

Fig. 6 is a perspective view of a box which may be formed of the fabric shown in Fig. 1; and

Fig. 7 is a plan of a blank died out into proper form for the production of part of the box shown in Fig. 6.

Referring more particularly to Figs. 1, 3 and 5 of the drawing, the composite fabric shown therein as one good form of the in-

vention, comprises a layer 1 which may be of paper or other appropriate fabric. This layer may be desirably of a strong, thin character, such, for example, as afforded by manilla paper. This layer may be pliant or so easily flexible that it will not have stiffness sufficient to render the same self-sustaining.

A suitable material or layer 3 may be provided to give the composite fabric substantial stiffness, in order that it may serve the uses referred to. This material preferably is made of cheap substance or substances which may not have substantial strength to resist tearing strains, but yet will have substantial stiffness. One good form of material for this purpose may be made of waste materials, such, for example, as the product commercially known as "chip board." The thickness of this stiffening material or board preferably is substantially greater than the thickness of the layer 1.

The layers described may be provided with suitable reinforcing filaments of various kinds, but preferably these filaments are unspun fibres preferably of long staple, such, for example, as sisal, flax, ramie, hemp, and other forms of fibres.

The unspun fibres are usually prepared in rovings or sliver form. That is, the fibres are reclaimed from the woody or other material which naturally adheres to them, and are then formed into long, untwisted rovings, rovings or slivers.

These rovings may be flattened or made into sheet-like form, with the fibres in substantial parallel relation. The sheet may be attenuated to the thickness desired. The fibres may be brought into substantial parallel relation in sheet-like form by any suitable known machine for the purpose.

For some purposes it is desirable that the composite fabric shall be provided with unspun fibres extending longitudinally and transversely of the fabric in crossing relation. In the present instance, in the form of fabric shown in Fig. 5, a sheet 5 of unspun fibres is shown extending longitudinally of the fabric, and a sheet 7 of unspun fibres is shown extending transversely of the fabric.

The present invention contemplates that these sheets of unspun fibres shall be adhesively secured to the layers 1 and 3. Any suitable adhesive may be employed, but preferably a waterproof adhesive is used,

such, for example, as black asphaltum. A layer or coating 9 of the adhesive is applied to the fabric 1, and preferably a layer or coating 11 of the adhesive is applied to the stiffening layer 3.

The sheets of unspun fibres are presented to the adhesive layers, and all of the layers are pressed together so as to form a composite fabric, as shown in Figs. 1 and 3.

For certain purposes it may suffice to have reinforcing filaments or fibres extending in one direction only. In Figs. 2 and 4 is shown such a fabric comprising a layer 13 which may be similar to the layer 1 referred to, a stiffening layer 15 which may be similar to the stiffening layer 3 referred to, unspun fibres 17 extending in substantial parallel direction, and an adhesive layer or coating 19 between the layers 13 and 15, and in which the unspun fibres are embedded.

In pressing the layers together, they may be passed through suitable rollers, one having a metallic surface, and the other having a rubber surface, the construction being such that when the fabric is passed between the rollers, the fibres may form slight ridges 21 in the paper or fabric layer adjacent the rubber surface roll.

The thinner outer layer 1 provides a strong outer surface, the relatively thick layer 3 provides stiffness, the filaments or unspun fibres provide strength, and the waterproof layer or layers prevent moisture from working through the fabric.

The fabric of the present invention is adapted for many different uses, such, for example, as in the production of boxes, wrappers and other containers.

As illustrating the use of the fabric in making boxes, reference may be had to Figs. 6 and 7 of the drawing. A blank 23 may be died out from the reinforced stiffened fabric, and have a back 25, sides 27 and ends 29 provided with wings 31 suitably formed to interlock with slits 33 in the sides 27.

Preferably the stiffening layer is at the inner face of the box, and the strong and more durable layer 1 is at the outer face of the box. To enable bending of the sides, ends and wings, the blank may be scored along lines 35 at the juncture of the body with the sides, along lines 37 at the juncture of the body with the ends, and along lines 39 at the juncture of the wings with the ends. These scoring lines are on the stiffening layer, and weaken the same somewhat, so that the sides and ends may be folded into planes perpendicular with the plane of the body 25, and the wings 31 may be folded into planes perpendicular to the ends 29, and be interlocked with the slits 23, thereby forming the body 41 of the box shown in Fig. 6. The cover 43 may be similarly formed.

When the blank is made from a composite

fabric having reinforcing filaments extending longitudinally and transversely thereof, filaments will extend transversely to all of the scoring or weakened lines of the stiffening layer, and thereby desirably reinforce the same and prevent rupture of the composite fabric along said lines.

Thus, a box or container is provided which is self-sustaining and of sufficient stiffness to hold its shape due to the stiffening layer 3. The outer surface is sufficiently strong to resist wear due to the character of the layer 1. The folds of the box are reinforced by the filaments or unspun fibres extending transversely thereof, and the ingress of moisture through the box is prevented by the waterproof adhesive. The wings 31 are desirably reinforced by the filaments or fibres, and can be relied upon to securely interlock with the slits 33 without rupture of the wings and consequent release of the connection of the sides and ends. For some purposes the box may be formed of a fabric having reinforcing filaments or fibres running in one direction only, but in boxes or containers experiencing harder usage and requiring greater strength, it is preferable to use a fabric in which filaments or fibres extend transversely to one another.

The fabric described is cheap and readily manufactured, and has a wide field of use.

It will be understood that the invention is not limited to the specific embodiment shown, and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. As an article of manufacture, a composite reinforced stiffened fabric for making boxes and other purposes, comprising a paper layer, a stiffening board substantially thicker than the paper layer, a sheet of reinforcing or strengthening unspun fibres extending in general parallel relation, and an adhesive layer securing the paper layer, backing and the series of unspun fibres together.

2. As an article of manufacture, a composite reinforced stiffened fabric for making boxes and other purposes, comprising a fabric layer, a stiffening board substantially thicker than the paper layer, a series of reinforcing strengthening unspun fibres extending in general parallel relation, and a waterproof adhesive layer securing the paper layer, stiffening board and unspun fibres together.

3. As an article of manufacture, a composite reinforced stiffened fabric for making boxes and other purposes, comprising a paper layer, a stiffening board substantially thicker than the paper layer, sheets of reinforcing strengthening unspun fibres adhesively secured to the paper layer and stiffening board, the fibres of said sheets ex-

tending in transverse relation to reinforce the fabric in transverse directions.

4. As an article of manufacture, a composite reinforced stiffened fabric for making boxes and other purposes, comprising a strong, thin fabric, a stiffening board substantially thicker than said fabric, and a series of reinforcing strengthening unspun fibres extending in general parallel relation, and adhesively secured to the fabric and stiffening board.

5. As an article of manufacture, a composite reinforced stiffened fabric for making boxes and other purposes, comprising a durable paper layer, a stiffening board substantially thicker than the paper layer, and a series of reinforcing or strengthening independent filaments extending in general

parallel relation and adhesively secured to the paper layer and the thicker stiffening board.

6. As an article of manufacture, a composite reinforced stiffened fabric for making boxes and other purposes, comprising a paper layer, a cheap paper pulp board substantially thicker than the paper layer, an adhesive layer between and securing the paper layer and stiffening board together, and a series of reinforcing or strengthening unspun fibres extending in general parallel relation between the paper layer and the stiffening board and embedded in the adhesive layer.

In testimony whereof, I have signed my name to this specification.

GEORGE OTIS COOMBS.