May 11, 1937. P. T. JACKSON 2,080,006

METHOD OF MAKING BOX CORNER STAY STRIPS

Original Filed Dec. 22, 1933

Fig. 1.

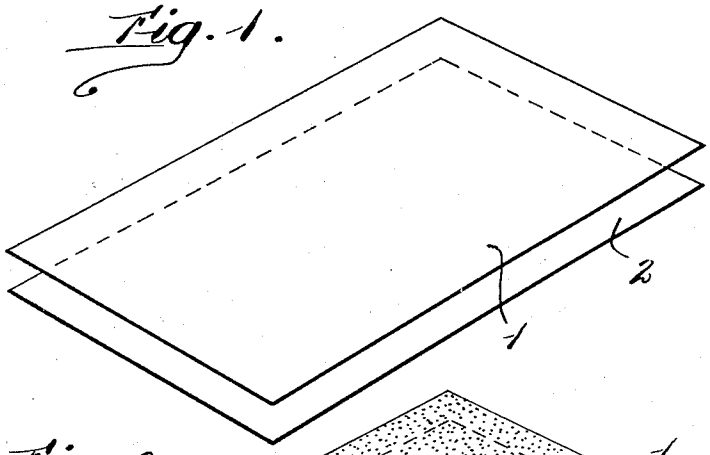


Fig. 2.

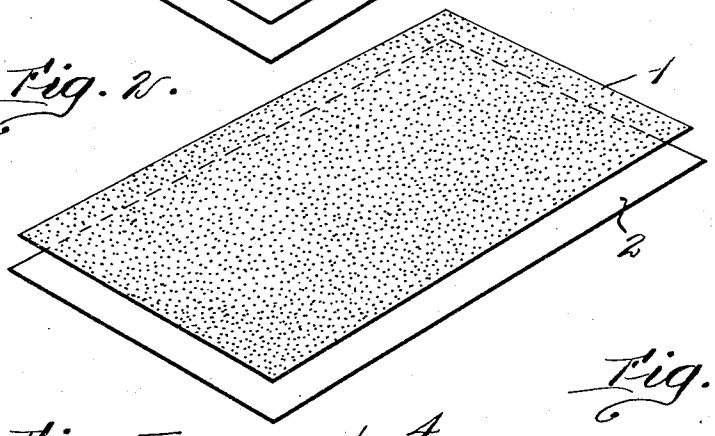


Fig. 3.

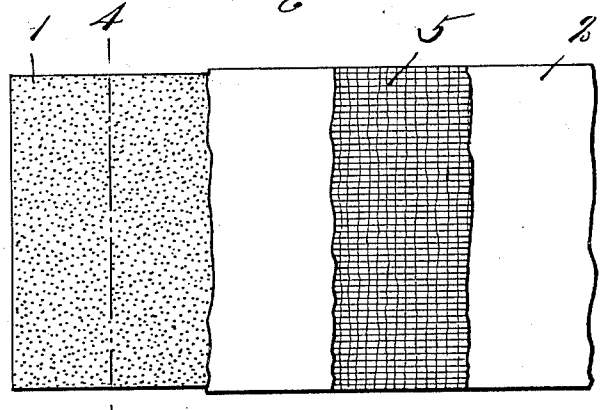


Fig. 5.

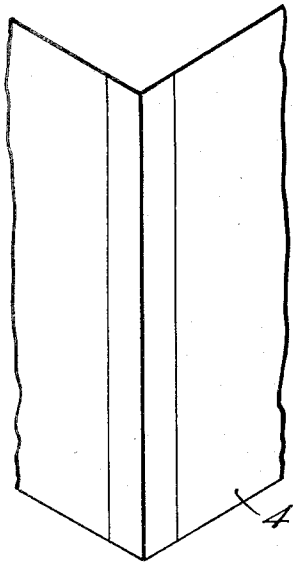
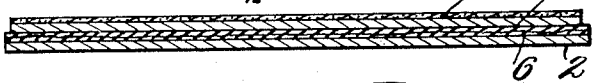


Fig. 4.



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METHOD OF MAKING BOX CORNER STAY STRIPS

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Refiled for abandoned application Serial No. 703,553, December 22, 1933. This application December 13, 1935, Serial No. 54,187

5 Claims. (Cl. 154—2)

This invention relates to improvements in the method or process of making composite reenforced material for box corner stay strips and is more particularly directed to such a method or process where at least one of the layers of the composite fabric is formed of paper.

It has been the practice heretofore to provide stay strips for the corners of boxes such for instance as paste board boxes, and among the suggestions in this connection stay strips have been made of a single sheet or layer of paper having one surface gummed by which it is secured to adjoining surfaces at the corner of a box. It has likewise been suggested that stay strips of composite character, that is made up of layers, could be applied to the corners of boxes.

Where the composite type of box corner stay strip is contemplated it has been the practice heretofore to unite the two plys or strips of paper by an adhesive, such for instance as asphaltum and to ship such material in large rolls to a gumming plant where gum, or glue, either vegetable or animal is applied to the surface of one of the strips for adhesive application to the box or other object, and thereafter the composite strip is subjected to a relatively high gum or glue drying temperature.

This practice, however, contemplates the application of the gum or glue after the two paper strips have been assembled and stuck together by asphaltum, but the gum or glue drying temperature causes the asphaltum to soften, thus weakening the bond between the two strips and permitting the strips to separate at intervals, and form the zone of weakness. This is particularly manifested along the edges of the strips, although it is not confined to this zone.

The application of the gum or glue to one of the paper strips after these strips have been secured together may have a tendency also to cause relative shrinkage of the two strips due to the moisture in the gum or glue at a time when the asphaltum itself has been softened and the bond between the two plys or paper strips has been weakened by the drying heat with the result that the two plys are liable to be separated at intervals and thus render the stay strip unsuitable. As will be evident the gum or glue when applied to the surface of one of the strips must be dried by a temperature which brings about the unfavorable conditions above noted.

The zone of weakness in the bond between the plys of paper may be observable in many cases in the formation of bulges, corrugations or blisters or the like especially in the ungummed paper strip, thus rendering the box corner stay strip substantially objectionable for use.

In describing the method or process of the present invention it will be assumed that a composite reenforced stay strip for box corners and the like is to be formed of two sheets or plys of paper, one or both of which may be of the plain surfaced or creped type on one or both surfaces and secured together adhesively by asphaltum or the like and reenforced by reenforcing filaments between the strips.

An important feature of the present invention consists in causing one of the plys of paper, that to be next to the box corner when the stay strip is applied, to shrink, a condition which is advantageously accomplished by a glue or gum. The gum or glue thus applied to one surface of the paper strip which is to be next to the box corner when in use, is then permitted to set or dry before combining it with its companion paper strip. The gum thus applied is then permitted to set or is dried so that it presents a gum or glued surface which may be rendered adhesive by the application of moisture.

The strip of paper as it is treated, as described, will shrink or contract to a more or less extent owing to the moisture that is applied, but when the gum or glue has become set under treatment by the usual drying process this shrinking manifestation will have ceased and no further shrinkage will occur on the lower or ply of paper next to the box.

It will be obvious from what has been said that one of the strips or plys of paper will be shrunk before application to its companion ply. The dried gum or glued ply of paper will then be associated with its corresponding ungummed strip of paper opposite to the ungummed surface of the gummed strip. At this point in the process or method asphaltum or like adhesive which is preferably waterproof is applied to the ungummed surface of one or both paper strips, and reenforcing filaments are placed upon the asphalt and the two strips of paper are then joined together adhesively by the asphaltum which also holds the reenforcing elements between the two strips.

At this stage of the method or process the previously gummed surface of the gummed paper strip will rest against the portions of the box at each side of the corner and hold the composite and reenforced fabric in its staying position without at the same time causing the outer paper strip from becoming objectionably tensioned, such that the outer paper strip will provide a smooth and

homogeneous surface to the stay strip as a whole.

In applying the unspun reenforcing fibres, the fibres are first "prepared" in the usual manner according to the character of fibres employed which has the effect of laying the fibres in a general parallel relation, but since the machines and process for preparing and applying the fibres are well known to those skilled in the art a detailed description of such machines or processes is unnecessary.

As contradistinguished from the heretofore old method of applying gum to one surface of one of the strips of paper after the strips have been secured together by an adhesive or asphaltum which, as above stated, may result in the separation of the two paper strips and a possible relative shrinkage of the two strips, the present method, by the application of the gum or glue to the surface of one of the strips and submission of that strip to the drying heat-prior to its assemblage with the other paper strip results in a close bond between the two paper strips throughout their extent, and eliminates all liability of relative shrinkage or separation between the two strips.

As a graphic illustration the accompanying drawing will serve to make clear the steps of the present process or method but it is to be understood that while the layers or paper sheets are shown as of limited extent they may be of any suitable length.

Fig. 1 represents two layers of paper of substantially equal size but neither of the layers has been treated with gum or glue;

Fig. 2 represents the same two papers layers or plys, not yet assembled together, but in which one of the sheets or plys has been treated with gum or glue and dried;

Fig. 3 is a plan view of the completed box corner stay material with parts broken away;

Fig. 4 is a section on the line **4—4** of Fig. 3; and

Fig. 5 is a view of a box corner stay strip in its operative position on a box.

For the purpose of clearness the two strips or layers of paper, as indicated in Figs. 1 and 2 are designated **1** and **2** and it will be noted in Fig. 1 that they are of the same dimensions and represent two plys of paper before either one has been treated or contracted by an adhesive.

In Fig. 2 the upper ply or strip of paper has been treated with a gum or glue and dried so that its dimension is less than the lower sheet or ply **2**.

Fig. 3 shows the two plys of paper united together by an adhesive such as asphaltum and the reenforcing unspun fibres extending transversely and it will be noted that as indicated in Fig. 2 that the previously gummed and dried ply of paper has been shrunk thereby compensating for the bends that take place upon the box **4**.

In Fig. 4 the top layer represents the sheet or ply **1** which is to come next to the sides of the box when the box corner stay strip is in operative position. **5** is an exaggerated view of the unspun reenforcing fibres, while **6** represents the asphaltum or adhesive between the plys or paper strips and **2** indicates the outside layer of the composite fabric.

From the construction described it will be apparent that the sheets or plys of paper are of the same dimension before they are put together or united by an adhesive. The inner sheet is then shrunk by the application of a liquid, such as an adhesive and such shrinkage becomes set or fixed when the glued or gummed paper strip has been subjected to the drying heat. After the gummed ply of paper has been thus treated and dried it is combined with the other or outer sheet and between the two there is an interposed adhesive such as asphaltum and reenforcing filaments, the effect being that when the box corner stay strip is placed about the corner of the box, as indicated in Fig. 5, the inner strip which has been previously gummed and dried will be next to the box, while the outer strip (now adhesively joined to the inner strip) will take the curve or bend about the corner of the strip without causing any puckering or separation between the two strips.

While applicant has had an application pending in the Patent Office Ser. No. 703,553, filed Dec. 22, 1933, such application has become abandoned.

What is claimed is:—

1. That improvement in methods of making composite reenforced material for box corner stay strips, which consists in first shrinking a paper strip before assembling with the other paper strip by applying a gum to one surface of a paper strip and permitting the gum to set or become substantially dry under the application of heat, then assembling therewith an ungummed paper strip and a series of reenforcing elements adjacent the ungummed surface of the gummed paper strip, and securing the two strips of paper face to face by a waterproof adhesive with the reenforcing elements embedded in the adhesive between the two paper strips.

2. That improvement in methods of making composite reenforced material for box corner stay strips, which consists in shrinking a paper strip to a size or dimension less than the companion paper strip by pregumming one surface of the paper strip and subjecting the gummed paper strip to a heat treatment to dry the paper strip and cause it to shrink, and thereafter assembling an ungummed paper strip and transversely extending unspun fibres opposite the ungummed surface of the gummed paper strip, and securing the two paper strips together face to face by an adhesive with the unspun fibres therebetween.

3. That improvement in methods of making composite reenforced material for adhesive connection to objects which consists in assembling two strips of sheet material originally of the same size or dimension one at least of which is paper having one surface thereof pregummed and heat treated to shrink the same, depositing on the ungummed surface of at least one of said sheets a waterproof adhesive and transversely extending reenforcing filaments, and securing the two strips together face to face by the waterproof adhesive.

4. That improvement in methods of making composite reenforced material for adhesive connection to objects, which consists in separately shrinking a paper strip by the application of a gum and drying heat to one surface thereof, assembling an ungummed strip of sheet material opposite the ungummed surface of the gummed strip of paper, coating the ungummed surface of at least one of said strips with asphalt, laying reenforcing filaments transversely between the strips, and securing the two strips together face to face with the transverse reenforcing filaments embedded in the asphalt.

5. The improvement in methods of making composite reenforced material for box corner stay strips composed of two layers of paper secured together face to face by asphaltum, which

consists in applying gum or glue to a surface of one of said layers to shrink it before its combination with the other layer, subjecting said gummed or glued layer to a drying heat to set the gum or glue, thereafter assembling the gummed or glued layer and another ungummed layer, applying asphaltum to the ungummed surface of one or both of said layers, placing unspun fibres transversely between the two layers, and securing the two layers together face to face by the asphaltum with the unspun fibres embedded in the asphaltum.

PATRICK T. JACKSON.