Jan. 19, 1932. G. E. GIBBS 1,841,946

COMPOSITE PAPER

Original Filed Sept. 11, 1929 2 Sheets-Sheet 1

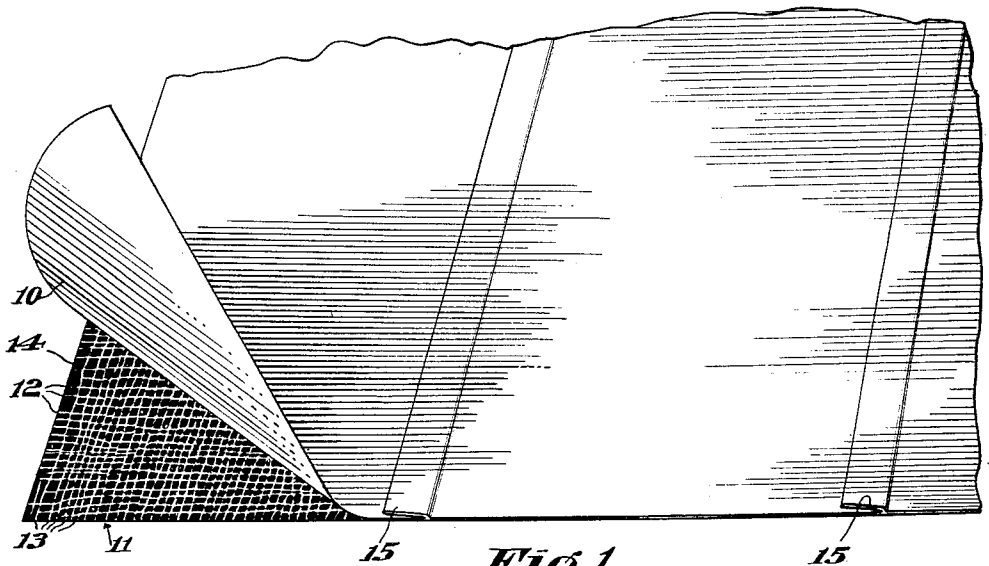


Fig. 1

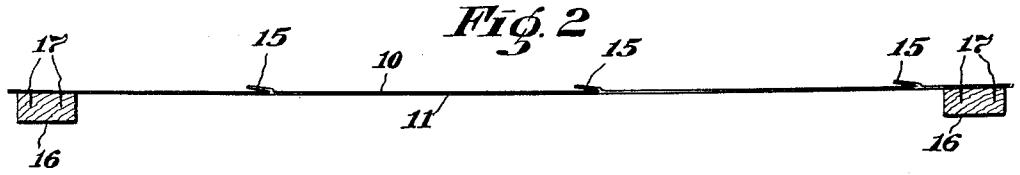


Fig. 2

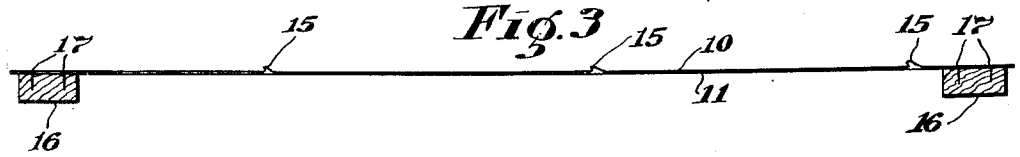


Fig. 3



Fig. 4

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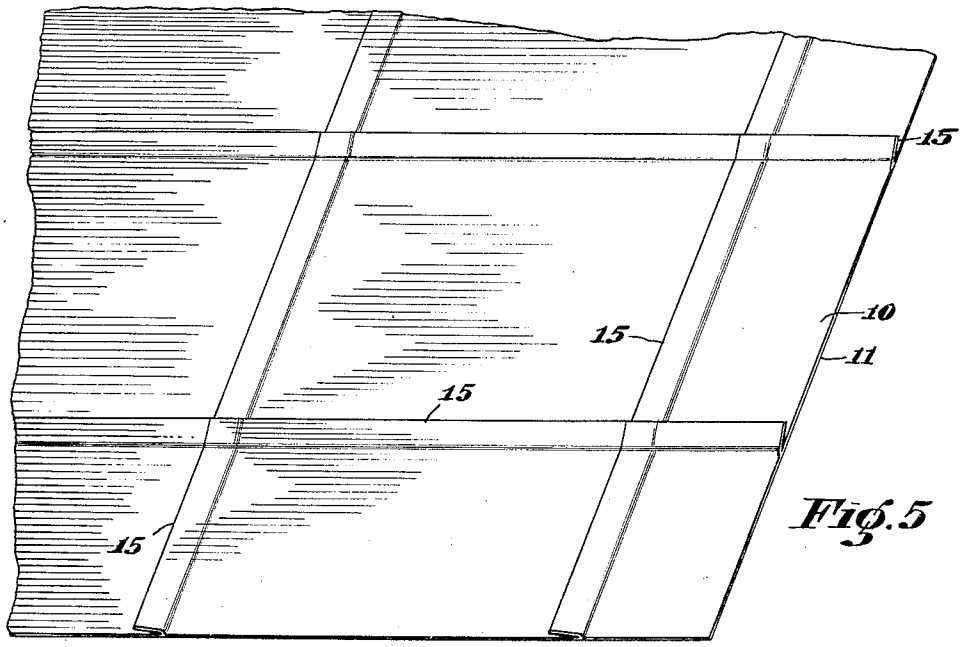


Fig. 5

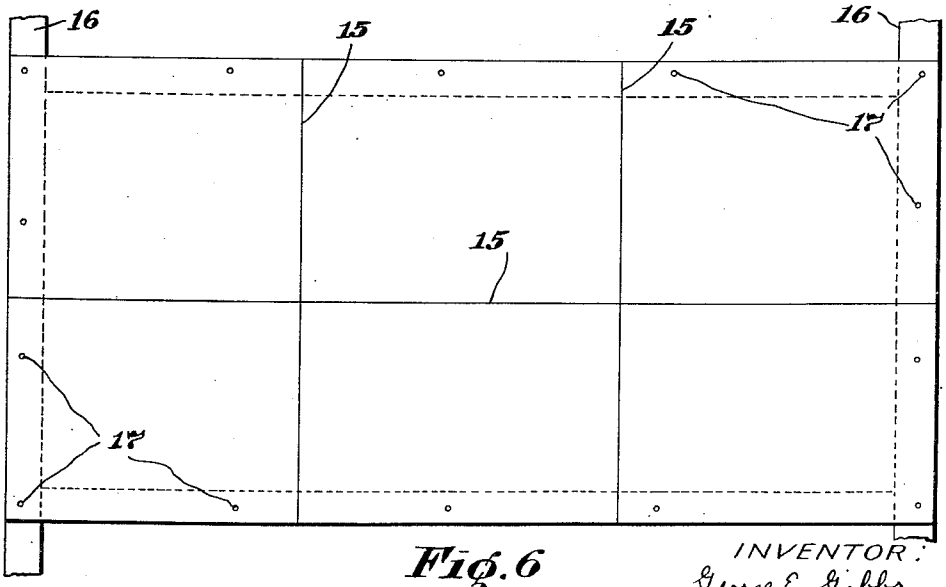


Fig. 6

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UNITED STATES PATENT OFFICE

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COMPOSITE PAPER

Application filed September 11, 1929, Serial No. 391,931. Renewed July 8, 1931.

This invention relates to a multiply paper consisting of two or more sheets of paper adhesively secured together.

Multiply reenforced paper is now extensively used as a building and wrapping paper and it is found that under certain weather conditions the outer sheet of the multiply paper shrinks to a pronounced degree when exposed to the rain and sun. This shrinkage of the paper is objectionable because it frequently causes the marginal edges of the paper to pull loose from the building structure to which they may be nailed or otherwise secured.

The shrinkage of the exposed outer sheet of the multiply paper occurs most frequently in hot climates, and is due largely to the exposed sheet of paper becoming wet by rain and then rapidly dried by the hot sun rays. Under these particular climate conditions the wet outer sheet of paper is dried very rapidly and this rapid drying causes the sheet to shrink to a pronounced degree. The shinking pull is imparted to the inner sheet of paper to which the outer sheet is adhesively secured, with the result that the overall dimension of the multiply paper is reduced and this frequently causes the marginal edges of the multiply paper to be pulled loose from the supporting structure to which the edges are secured.

When the sheets of the multiply paper are secured together by a water-proof adhesive as is the usual case in a multiply building paper, the moisture or rain which wets the outer sheet of paper is prevented by the water-proof adhesive from reaching the inner sheet of paper, and as a result the inner sheet of paper remains dry and therefore is not subjected to a shrinking action like the outer sheet. However, as above stated, in the constructions employed heretofore, the shrinking action of the outer sheet of paper imparts a similar contracting pull to the inner sheet of paper, due to the adhesive connection between the sheets.

The present invention therefore seeks to overcome the above mentioned difficulties caused by the shrinkage of the outer or exposed sheet of paper, and an important feature of the invention resides in a composite fabric formed of two or more sheets of paper adhesively secured together, and at least one of the sheets of paper being provided with folds forming plaits disposed in spaced relation to each other over the surface of the sheets and adapted to straighten out as the sheet shrinks. As a result of this construction the contracting action of the paper will serve to straighten out the folds or plaits instead of reducing the overall dimensions of the composite sheet of paper.

The folds or plaits may be formed either longitudinally or transversely of the exposed sheet of paper or if desired both longitudinally and transversely of said sheet, and in some cases, for example when either face of the composite sheet is likely to be exposed to the weather, the folds or plaits may be formed in both sheets of paper. In many cases, however, the formation of the plaits in the particular sheet of paper which is to be exposed to the weather will be sufficient to prevent a decrease in the overall dimensions of the composite sheet due to shrinkage.

It has been proposed heretofore in the construction of multiply paper to secure the sheets of paper together by a water-proof adhesive such as black asphaltum. This adhesive is admirably adapted for use in connection with the present invention, because the conditions which cause shrinkage of the paper to an objectional degree usually occur only when the weather is hot enough to soften the black asphaltum cement sufficiently to permit creepage between the adhesively connected sheets of paper.

That is, when plaits are employed in accordance with the present invention to prevent the overall dimensions of a sheet of paper from being decreased by shrinkage it is important that a creepage action be permitted between the adhesively connected sheet of paper, and as above stated when the paper is exposed to weather conditions that will produce a pronounced shrinkage of the paper the black asphaltum will be at the time the shrinkage occurs in a sufficiently soft and plastic condition to permit the necessary creepage between the different sections of the adhesively

connected paper, it being understood that the amount of creepage that takes place between the different sections of the sheets of paper may be reduced by placing the plaits as close together as found desirable.

The above and other features of the invention will be hereinafter described in connection with the accompanying drawings illustrating good practical embodiments thereof.

In the drawings:—

Fig. 1 is a perspective view of a piece of reenforced paper constructed in accordance with the present invention, one of the sheets of paper being turned back to show the reenforcing fibres.

Fig. 2 is a sectional view showing the reenforced paper of Fig. 1 with its marginal edges attached to supporting structure.

Fig. 3 is a view similar to Fig. 2 but shows the exposed sheet of paper after it has been shrunk.

Fig. 4 on an enlarged scale is a sectional view through a composite fabric having both outer sheets provided with the plaits of the present invention.

Fig. 5 is a perspective view of a piece of multiply paper having the plaits extending both longitudinally and transversely; and

Fig. 6 is a plan view showing the paper of Fig. 5 as secured to a supporting structure.

While the present invention is applicable to both reenforced and unreenforced multiply paper consisting of two or more sheets of paper adhesively secured together, it has an important field of use in connection with reenforced paper and has therefore been shown in the drawings as applicable to reenforced sheets of paper.

In each of the drawings illustrated the multiply fabric consists of two sheets of paper 10 and 11 reenforced by straightened unspun fibres, 12 and 13 extending longitudinally and transversely of the sheets of paper and adhesively secured therebetween by a waterproof adhesive 14 such as black asphaltum.

In the embodiment of the invention shown in Figs. 1, 2 and 3 the plaits 15 are formed in only one of the sheets of paper it being assumed in this construction that only the plaited sheet 10 of the paper is to be exposed to the rain and sun. The plaits 15 may be produced by folding the sheet 10 at spaced intervals to form any desired size plaits which may be positioned as close together as found necessary to prevent the shrinkage of the sheet of paper 10 from pulling the marginal edges of the composite sheet of paper away from the supporting structure 16 to which the paper may be secured by tacks 17.

When the outer sheet of paper 10 of Fig. 2 is caused to shrink due to exposure to the weather or by other conditions the contraction which takes place in the various portions of this sheet will serve to straighten out the plaits 10 as shown in Fig. 3 instead of pulling the marginal portions of the composite fabric away from the supports 16 as has been the case heretofore.

Usually pronounced shrinkage of the exposed sheet will take place only at relatively high atmospheric temperatures at which time the black asphaltum adhesive 14 will be sufficiently soft and pliable to permit one sheet of paper to creep relative to the other thus permitting the plaits 15 to be reduced in size, as shown in Fig. 3 or straightened out without tearing the paper.

It will be understood that when the outer sheet becomes wet due to exposure to rain or moisture it may expand somewhat relative to the inner sheet which is protected from the moisture by the waterproof adhesive, and while this expansion may cause slight puckers to occur temporarily in the wet sheet it does not injure the paper or pull it loose from the supporting structure.

In some cases it may be desirable to provide the folds or plaits 15 in both sheets of paper 10 and 11 as shown in Fig. 4 in which case the plaits at the opposite faces of the composite fabric are preferably disposed in staggered relation to each other as shown.

In other cases it may be desirable to form the plaits both longitudinally and transversely of the exposed sheet of paper 10 as shown in Figs. 5 and 6 to thereby relieve the marginal edges of the paper from injurious strains in either direction due to shrinkage. The folds or plaits 15 may readily be produced in the sheet 10 or sheets 10 and 11 before the sheets are adhesively secured together through the use of any suitable paper folding or plaiting mechanism.

It will be apparent from the foregoing that by employing the plaits 15 in accordance with the present invention the difficulties experienced heretofore due to shrinkage of one of the sheets of a multiply paper fabric is eliminated, and that either or both sheets of paper of the composite fabric may shrink, when the construction of the present invention is employed, without causing a reduction in the overall dimension of the fabric.

What is claimed is:

1. As an article of manufacture, a multiply building paper comprising two flat sheets of paper of slightly different length adhesively secured together, and the outer and longer sheet that is exposed to the weather being provided at spaced intervals with small folds forming plaits that decrease the length of the sheet slightly and adapted to straighten out as this sheet shrinks relatively to the other sheet, to thereby prevent the overall dimension of the multiply paper from decreasing under the shrinking action of the outer sheet.

2. As an article of manufacture, a composite reenforced fabric consisting of two sheets of paper of slightly different length

provided with reenforcing fibres adhesively secured between them, and the outer and longer sheet that is exposed to the weather being provided at spaced intervals with small folds forming plaits upon its outer face that decrease the length of the sheet slightly and adapted to straighten out as this sheet shrinks relatively to the other sheet, to thereby prevent the overall dimension of the composite fabric from decreasing under the shrinking action of the outer sheet.

3. As an article of manufacture, a multiply building paper comprising two flat sheets of paper one of which is slightly larger than the other, and the outer and larger sheet that is exposed to the weather being provided at spaced intervals with small folds forming plaits extending longitudinally and transversely of the sheet to reduce its size slightly and adapted to straighten out as this sheet shrinks relatively to the other sheet, to thereby prevent the overall dimension of the multiply paper from decreasing under the shrinking action of the outer sheet.

4. As an article of manufacture, a composite building paper consisting of two sheets of paper adhesively secured together by a waterproof adhesive that is rendered sufficiently plastic by hot atmosphere conditions to permit a creeping movement of one sheet relative to the other, and the outer exposed sheet being provided at spaced intervals with small folds forming plaits that decrease the size of the sheet slightly and adapted to straighten out as this sheet shrinks, to thereby prevent the overall dimension of the composite paper from decreasing under the shrinking action of the outer sheet.

5. As an article of manufacture, a multiply building paper consisting of two flat sheets of paper reenforced by straightened fibres secured between the sheets of paper by a waterproof adhesive, and the outer exposed sheet being provided at spaced intervals with small folds forming plaits that decrease the size of the sheet slightly and which are adapted to straighten out as this sheet shrinks, to thereby prevent the overall dimension of the composite paper from decreasing under the shrinking action of the outer sheet.

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

GEORGE E. GIBBS.