

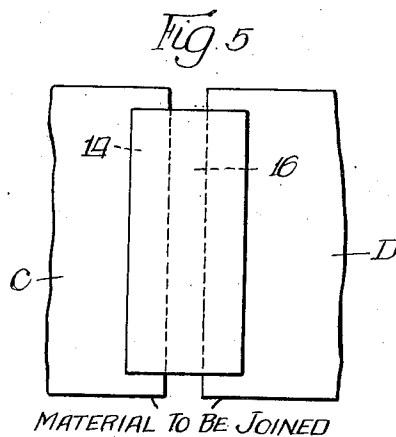
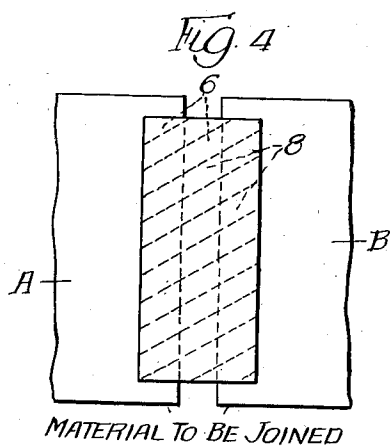
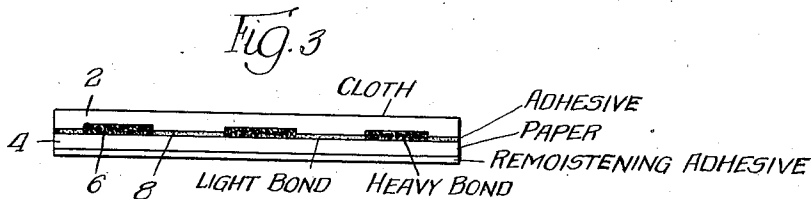
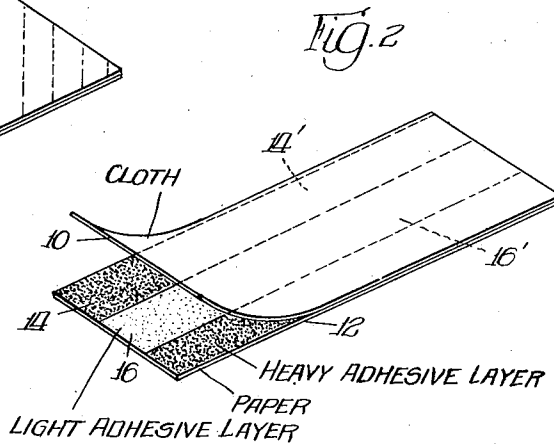
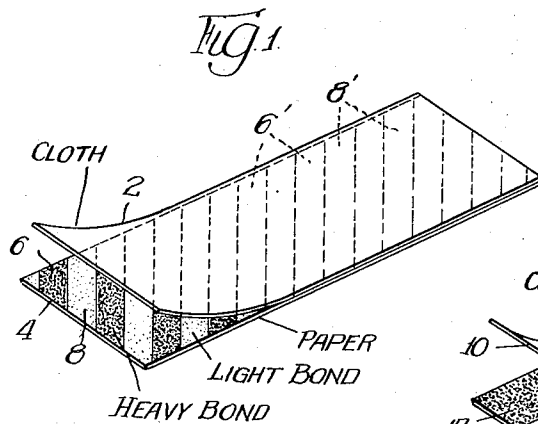
Aug. 25, 1942.

J. V. BAUER ET AL

2,294,347

CLOTH BACKED PAPER SEALING TAPE

Filed Dec. 24, 1938



INVENTOR.
Jordan V. Bauer,
Dora M. Hawley,
BY Richard P. [Signature]
ATTORNEY.

UNITED STATES PATENT OFFICE

2,294,347

CLOTH BACKED PAPER SEALING TAPE

Jordan V. Bauer, Elmwood Park, and Don M. Hawley, Geneva, Ill., assignors to Stein, Hall Manufacturing Company, Chicago, Ill., a corporation of Delaware

Application December 24, 1938, Serial No. 247,556

10 Claims. (Cl. 154-46)

This invention relates to an improved cloth backed tape, more particularly cloth backed paper tape of the type which is used for sealing purposes, staying the corners of paper boxes or for fastening together and acting as a hinge between two or more paper surfaces or other objects.

Cloth backed paper tape of this nature is generally prepared by laminating a sheet of woven fabric with a light sheet of paper by means of a suitable adhesive and subsequently slitting it into tapes of the desired width.

Tapes of this type have the advantage of having a smooth paper surface on one side to which an adhesive may readily be applied for the purpose of fastening the tape to other objects and yet by reason of the cloth backing, have considerably more strength and resistance to tear than would be obtainable by the use of a non-cloth backed paper tape.

It is highly desirable in view of the purposes for which they are used, that cloth backed paper tapes have a high degree of tear resistance and also a high degree of bond between the paper and the cloth backing. Heretofore these desirable qualities have been to a considerable degree incompatible due to the fact that if the degree of bond between the paper and cloth is increased, the tear resistance of the paper and cloth combination is invariably decreased. The reasons for this phenomenon will be apparent when the following conditions are considered.

When a woven fabric is subjected to a tearing stress the flexibility and stretch of the material are such that a large number of the individual threads that make up the structure act together to resist the tearing stress. On the other hand, if a piece of woven fabric is firmly bonded to a piece of paper which has a relatively small degree of stretch, the individual threads are so held in position that they cannot freely act to assist each other, and therefore, a tearing stress can be resisted only by one or a relatively few threads at a time. If, however, a piece of woven fabric is only poorly bonded to a piece of paper, a tearing stress will first tend to break the bond between the paper and the cloth, thus allowing a larger number of threads to act in unison to resist the tearing stress.

Although the bond between the cloth backing and the paper may readily be increased to any desired degree by either increasing the amount of bonding adhesive used or by using an adhesive of greater concentration or strength, it has not been possible to utilize a high degree of bond

and still obtain a combined cloth and paper product having a tear resistance comparable to that of the original uncombined cloth. As a result, manufacturers who wish to produce a cloth backed tape having a high degree of tear resistance can only do so by sacrificing the quality of bond between the paper and the cloth backing or otherwise using a stronger and more expensive cloth backing material.

It is an object of our invention to produce a cloth backed paper tape or other laminated material having a woven fabric laminated to a unified sheet material wherein the inherent tear resistance of the cloth or fabric backing is more completely retained while at the same time a high degree of bond between the cloth backing and the paper or other unified sheet material is also maintained.

A further object of our invention is to produce a cloth backed tape superior in effective tear resistance and bond to prior types of cloth backed tape made from the same materials without materially increasing the cost of manufacture. Other objects will appear hereinafter.

Our means of accomplishing these above mentioned objects is simple but highly effective. It is accomplished by having alternate areas of high and low bond between the cloth backing and the paper or other unified sheet material in the form of stripes extending across the width of the tape or diagonally across the tape, or up and down the length of the tape.

As a consequence of this mode of construction, areas of high resistance to tear extend across the width or length of the tape at those points or areas where the degree of bond is low, while areas of low resistance to tear extend across the width or length of the tape at those points or areas where the degree of bond between the paper and the cloth backing is high.

Inasmuch as sealing or staying tapes of this nature are almost invariably used for joining or fastening together two or more surfaces or objects which are spaced relatively close together, the effective resistance to tear is determined by the areas of high resistance to tear rather than by the areas of low tear resistance. Furthermore, the effective resistance to the separation of the bond between the paper and the cloth backing is determined by the areas of high bond rather than those areas of low bond.

For example, if under conditions of use a tearing stress is sufficient to start a tear in an area of low tear resistance, the tear cannot continue through the alternate area of high tear resist-

ance until the stress is sufficiently great to also overcome the resistance of this latter area. The effective resistance of the tape to a continuous tear is, therefore, determined by its areas of highest tear resistance.

Similarly, if a force tending to separate the bond between the paper and the cloth backing is encountered sufficient to separate the paper and the cloth at an area of low bond, the separation cannot continue through an area of high bond until the force is sufficient to also overcome the higher resistance to separation of this high bond area. Therefore, the effective resistance of the tape in regard to the separation of the cloth backing from the paper is determined essentially by the areas of high bond.

Our preferred means by which a tape of this description may be manufactured is by applying to a paper sheet a bonding adhesive in the form of a pattern of stripes comprising alternate areas of heavy and thin application of adhesive and subsequently bringing the adhesive coated side of the paper sheet into contact with a sheet of cloth and then drying the two sheets in contact to form the bond. The amount and distribution of bonding adhesive applied is such that in the areas of heavy application a very firm bond is formed between the cloth and paper, whereas in the areas of thin application, relatively little or no bond is formed between the cloth and the paper. After the cloth and paper have been bonded together, it may be slit into tapes of the desired width.

If a sealing or staying tape of the type known as gummed tape is desired, a coating of a suitable remoistening adhesive may be applied to the exposed paper face of the paper cloth combination either prior to, or after the slitting operation by any of the methods well known to the art.

Our invention may also be applied to tape which is sold in a non-gummed form to the consumer who subsequently applies an adhesive to the face of the tape just prior to usage.

The means by which the novel type of tape we disclose may be manufactured are numerous, inasmuch as the essential requirement is merely that adhesive used to bond the paper and cloth be applied to the paper in a pattern of heavy and thin areas of application rather than in a substantially continuous even coating. This result, for example, may be accomplished by using as a means of applying the adhesive a roll which is so etched or cut that the adhesive is printed on the surface of the paper in a pattern of alternate areas or stripes of heavy and thin adhesive concentration. Inasmuch as this and several other means of applying adhesives or other material in the form of a pattern to moving paper surfaces is well known, we do not claim these means as a part of our invention.

We do claim, however, as unique and highly useful, the novel tape product we herein disclose, namely, a laminated paper and cloth combination characterized by having alternate areas of high and low degrees of bond between the paper and the cloth, preferably in the form of stripes.

Other objects and advantages of our invention will appear through reference to the following description in conjunction with the accompanying drawing, in which:

Figure 1 represents a piece of our new type of tape;

Figure 2 represents a modified construction of our new type of tape;

Figure 3 illustrates a cross-sectional view of a preferred form of our new type of tape;

Figure 4 represents a method of applying the tape illustrated in Figure 1;

Figure 5 represents a method of applying the tape illustrated in Figure 4.

The cloth backing 2 in Figure 1 is shown partially separated from the paper 4. Shaded areas 6 and 8 represent respectively areas of heavy and light adhesive application. Reference numerals 6' and 8' on the non-separated portion of the tape represent corresponding areas of greater and lesser degrees of bond, respectively.

The optional construction illustrated in Figure 2 represents a piece of our new type of tape wherein the area of greater adhesion 14 and 14', and likewise the area of lesser adhesion 16 and 16' runs the length of the tape rather than in the form of a pattern of stripes across the width of the tape as shown in Figure 1.

The cross-sectional view in Figure 3 may be considered as a cross-section through either Figures 1 or 2, showing areas of heavy bond 6 and light bond 8 between cloth backing layer 2 and paper layer 4. As illustrated in the drawing, a remoistening adhesive may be applied to the outer surface of paper layer 4 thereby forming a remoistening tape suitable for sealing purposes. It will be observed that the stripes or areas of heavy bond 6 penetrate substantially into cloth 2 while the stripes of areas of light bond 8 have primarily a surface effect. This may be one reason why areas of heavy bond show less tear resistance than areas of light bond. It will be understood of course that for ordinary purposes the area of heavy bond 6 could not penetrate entirely through the cloth 2 because ordinarily it is undesirable to have the surface of the cloth adhesive.

A method of applying the tape of Figure 1 is shown in Figure 4 in which two pieces of material A and B which may be made of paper, for example, are sealed together by applying the cloth backed tape of Figure 1 in such a way that the diagonal stripes of heavy and light bond 6 and 8, respectively, run diagonally with respect to materials A and B. It will thus be seen that the tearing stress through the paper tape must pass through alternate areas by heavy bond and light bond. The usual method of testing tear resistance in the manufacture of cloth backed paper tapes is by means of an Elmendorf paper tester manufactured by the Thwing Instrument Company of Philadelphia, Pennsylvania. Our cloth backed tape shows a higher Elmendorf for a comparable degree of bond between the cloth and the paper than similar tapes prepared by the usual methods. By our methods we are able to prepare cloth backed paper tapes with lower grade and lower cost fabrics or cloth materials while maintaining the same Elmendorf than are possible with present day methods of making cloth backed paper tapes.

In Figure 5 we illustrate the method of applying a cloth backed paper tape as shown in Figure 2. As illustrated, the materials to be joined, C and D, which may be paper or other material, are joined to that portion of the cloth backed paper tape having a heavy bond 14 while the juncture between the materials C and D is covered by an area 16 where there is a light bond between the cloth and paper. This bond is preferably so light as to give substantially the full

effect of the cloth in resisting tear and therefore, the greatest tear resistance will be found at this juncture where it is needed most.

We have used the expression "bond" in the present application to describe the adhesive character of the joint between the cloth and the paper. In other words, the bond is the force required to separate the tape from the paper. With a high bond this force will be relatively greater than with a low bond. Bond is usually measured in terms of pounds of pull required to separate the cloth from the paper in a two inch tape. Thus, a low bond, for example, might require about one pound pull to effect separation of the cloth from the paper. This can be determined roughly by separating the cloth and paper slightly and attaching to the cloth a spring scale then pulling on the scale and noting the number of pounds registered on the scale for a continuous pull sufficient to separate the cloth and paper. A relatively high bond might be, for example, five or six pounds on a two inch tape. For the purpose of our invention, any substantial difference in the bond of alternate areas between the cloth and the paper gives improved results. Instead of having alternate areas of light bond and heavy bond we may have alternate areas of bond and no bond. As an illustration of our invention, for example, we may prepare tapes in which one area or stripe has, say, zero to a three pound bond while adjacent or alternate areas have a four to fifteen pound bond or higher. It will be understood that this example is for the purpose of illustration only and is not intended to be a limitation upon our invention.

The width of the alternate areas or stripes of high or low bond between cloth and paper may vary through a considerable range depending upon the width of the tape itself and the purpose for which it is to be used. For a tape of the type illustrated by Figure 1 the width of the alternate areas might be, for example, from one-eighth inch to three-fourths inch, whereas for a tape of the type illustrated in Figure 2 the width of the area of low bond running down the center of the tape might be from three-eighths inch to one and one-half inch.

It will be understood that there is no limitation on the type of cloth which may be employed in making our tape. Likewise, many different types of adhesives may be employed including animal adhesives, vegetable adhesives, protein type adhesives and synthetic resin type adhesives. Particularly good results have been obtained with amylaceous adhesives made from starches and derivatives thereof, but the invention is not limited in this respect. Different types of adhesives, either animal or vegetable, may be employed for forming the alternate high and low bond areas or stripes. Thus, an animal adhesive might be used to form one bond and a vegetable adhesive to form an adjacent bond.

While the invention is particularly applicable to combining paper with cloth, other similar flexible cellulosic materials in sheet form, including regenerated cellulosic materials. Cellulose ester and ether materials and sheet materials made of or containing synthetic resins may be similarly employed in the invention. Any suitable types of cloth may be used, as, for example, cotton, wool, silk or other cloths.

It should be understood that there are numerous variations in the manner and in the pattern in which the adhesive may be applied without de-

parting from the scope of our invention. We therefore do not wish our invention to be limited by the attached drawing, but only by the prior art and the appended claims.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A sealing tape comprising an adhesively laminated cloth and sheet material having alternate areas of different bond between the cloth and the sheet material, and a separate layer of adhesive on the outer surface of said sheet material.

2. A sealing tape comprising an adhesively laminated cloth and paper material having alternate areas of different bond between the cloth and the paper, and a separate layer of adhesive on the outer surface of said sheet material.

3. A cloth backed paper tape comprising cloth and paper adhesively secured together and characterized by having alternate predetermined areas of greater and lesser degrees of bond between the cloth and the paper in the form of a pattern of stripes running across the width of the tape, and a separate layer of adhesive on the outer surface of said sheet material.

4. A cloth backed paper tape comprising cloth and paper adhesively secured together and characterized by having alternate areas of greater and lesser degrees of bond between the cloth and the paper in the form of a predetermined pattern of stripes running up and down the length of the tape, and a separate layer of adhesive on the outer surface of said sheet material.

5. A laminated cloth and paper sealing tape characterized by having alternate areas of different adhesive bond between the cloth and the paper, said alternate areas being alternate areas of relatively high and low bond in the form of stripes running diagonally across the width of the tape, and a separate layer of adhesive on the outer surface of said sheet material.

6. A laminated cloth and paper sealing tape characterized by having areas of relatively high adhesive bond at the edge of the tape but with an area of no adhesive bond to a relatively low adhesive bond, as compared with the high adhesive bond at the edge of the tape, in the form of a stripe running lengthwise down the center of the tape, and a separate layer of adhesive on the outer surface of said sheet material.

7. An article of manufacture for use in sealing and joining other materials together comprising an adhesively laminated cloth and sheet material of flexible character having alternate predetermined areas of different bond between the cloth and the sheet material, and a layer of remoistening adhesive applied to the outer surface of the sheet material.

8. An article of manufacture for use in sealing and joining other materials together comprising an adhesively laminated cloth and paper material having alternate areas of different bond between the cloth and the paper, and a coating of remoistening adhesive applied to the outer surface of the paper.

9. An adhesively laminated cloth and paper sealing material having alternate areas of different adhesive bond between the cloth and the paper, said areas comprising areas of no adhesive bond to about three pounds adhesive bond, as measured on a tape of the same adhesive bond and same material two inches wide and areas of higher adhesive bond from about four pounds to about fifteen pounds, as measured on a tape of

the same adhesive bond and same material two inches wide.

10. A cloth backed paper gummed tape comprising a strip of paper having a remoistening adhesive on one side thereof and bonded on the other side to a strip of cloth, said bond between the cloth and the paper being formed by layers of

5 adhesive alternating with spaces having no adhesive whereby the tear resistance of said tape is increased, the adhesive forming said bond between said cloth and said paper being an amylaceous adhesive.

JORDAN V. BAUER.
DON M. HAWLEY.