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2,555,564

EXPANDABLE ADHESIVE MATERIAL

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FIG. 1.

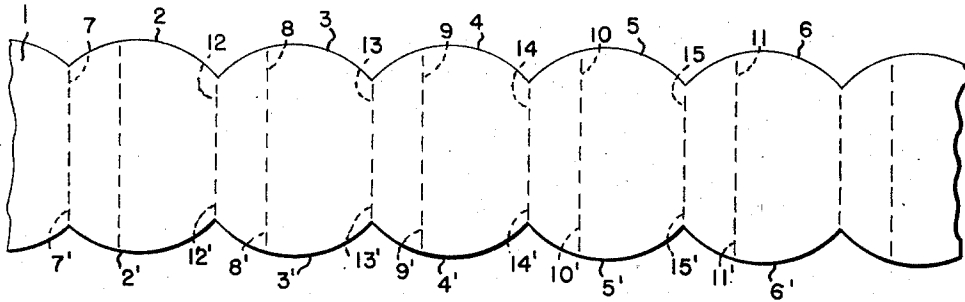


FIG. 2.

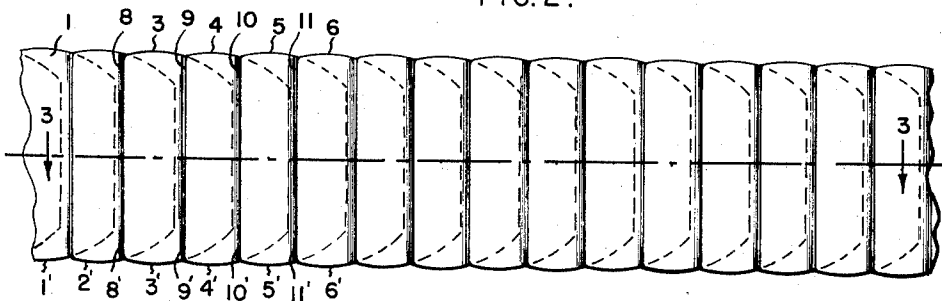


FIG. 3.

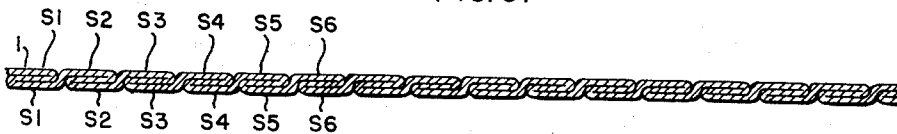


FIG. 4.

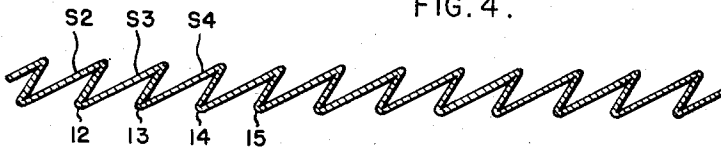
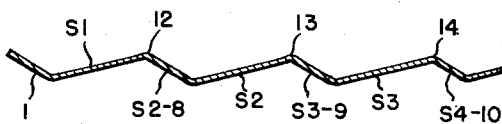


FIG. 5.



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EXPANDIBLE ADHESIVE MATERIAL

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3 Claims. (Cl. 117-122)

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This invention relates to improvements in expandable adhesive materials, and particularly to expandable adhesive sheets, rolls, tapes, etc. of paper, plastics, fabric, etc.

Although my invention may take an infinite variety of forms, the preferred form of which is illustrated in the drawing, it may be most easily explained and understood by first disclosing its application to ordinary paper sealing tape of the gummed type and to the so-called pressure sensitive type. First let us consider ordinary gummed paper tape.

A vast amount of gummed paper tape is sold for commercial and industrial purposes. One of the uses to which it is applied is the sealing of card-board or fiber cartons to avoid the necessity of tying with twine. Gummed paper sealing tape is less costly than twine, is applied more quickly and makes a more secure and effective package than twine. It possesses many and diverse advantages over twine in various applications which it is not necessary to describe here. Its principal disadvantage lies in the fact that it is most effective when applied to flat surfaces. It is not ordinarily easily applied nor does it ordinarily make a neat package when applied to uneven surfaces.

To overcome this disadvantage is one of the objects of my invention. I accomplish this by pleating the tape to give it whatever degree of expandability is necessary to enable it to adhere to rough and uneven surfaces. The size and variety of pleats used is determined by the shape of the package to which it is to be applied.

Another disadvantage of ordinary gummed paper tape is that for increased binding strength it is frequently necessary to apply several layers of tape one upon another. As each layer adheres to the layer below it, a break in the carton underneath all the layers is very likely to extend through all the adhering layers.

To overcome this disadvantage it is an object of my invention to provide a tape of increased strength, part of the surface of which does not adhere to the carton or to the underlying layer of tape where even more than one layer of increased strength is used. I accomplish this by pleating the tape longitudinally with respect to its edges, using a wider tape of the same weight or thickness which, after pleating, is of the same width as the flat tape which it is designed to replace, thereby providing increased strength longitudinally and at the same time protecting a part of the surface of the tape against breakage of the carton because that part of the tape does not adhere to the carton but is detached therefrom.

Another disadvantage of gummed paper tape

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is that it must be applied in straight lines. In applications of circular shape, even though on a flat surface, it is practically impossible to use gummed paper tape because neither edge is elastic or expandable so that it is not practical to curve the tape by extending one edge longitudinally over a greater distance than the other.

I overcome this disadvantage of ordinary gummed tape by pleating the tape diagonally at whatever angle is necessary to fit the degree of curvature to which the tape is to be applied.

These and other advantages of my invention will become more evident by a reference to the drawings in which:

Figure 1 is a plan view of the preferred form of my invention applied to a strip of gummed tape with scalloped edges.

Figure 2 is a plan view of the same strip of gummed tape pleated to make it expandable.

Figure 3 is a cross section of the pleated strip of tape taken along the line 3-3 of Figure 2.

Figure 4 is a cross sectional view of the same strip of tape shown in Figure 3 expanded to almost its entire length, to show more specifically how the pleated tape extends to provide expandability.

Figure 5 is a detailed sectional view of the tape.

In Figures 1 and 3 the drawing shows a series of segments S1, S2, S3, S4 and S5 of a strip of gummed tape having scalloped edges, 2-2', 3-3', 4-4', 5-5' and 6-6'. The points at which the tape is to be folded back and forth upon itself to form pleats are indicated by the dash and dot lines 7-7', 8-8', 9-9', 10-10' and 11-11', at approximately one-third of the segments S1, S2, S3, S4 and S5, and the dash and dot lines 12-12', 13-13', 14-14' and 15-15' between said segments.

In Figure 2 the segments S2, S3, S4 and S5 of tape 1, are shown pleated, with the fold lines 8-8', 9-9', 10-10' and 11-11' visible from the front, the fold lines 12-12', 13-13' and 14-14' falling behind the fold lines 8-8', 9-9', 10-10' and 11-11', and therefore, not indicated. Fold point 7-7' in segment S1 is indicated because segment S1 is shown unfolded. Fold line 11-11' is indicated by a dotted line because it is not covered by a pleat line in the contiguous segment. The covered portions of segments S1, S2, S3 and S4 are indicated by the dotted line extensions to scallop lines 2-2', 3-3', 4-4' and 5-5'. Those portions of segments S2, S3, S4 and S5, projecting beyond the extremities of segments S1, S2, S3 and S4 are indicated by the numerals 16-16', 17-17', 18-18' and 19-19'.

In Figure 3 the cross sectional view shows how segment S1 folds underneath segment S2, how

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segment S2 folds below segment 3, S3 below S4 and S4 below S5, also how segment S2 folds back upon itself above segment S1, how S3 folds back upon itself above S2, S4 above S3, and S5 above S4. Here again the fold lines 8, 9, 10 and 11 are indicated.

In Figure 4 the angular form of the segments S1, S2, S3, S4 and S5 of tape are more clearly indicated, as are also the fold lines 7, 8, 9, 10 and 11.

In Figure 5 the tape is illustrated in an unfolded state to more clearly show the fold lines.

Throughout this disclosure the term "pleat" is intended to indicate any manner, shape or form of folding back and forth upon itself, the body of the element forming the basis for the adhesive material, thus providing expandability in one or more directions. Between the forms of pleats shown there lies an endless variety of other forms. There are also other types of pleats, as for instance, what is known as a "box pleat," or the opposite of it, known as an "inverted box pleat." Whatever the form, my invention embraces any and all foldings, longitudinal, transverse, diagonal, etc., whereby one edge of an adhesive tape may be expanded with or without expansion of the other edge, or any point between the edges may be expanded without a corresponding expansion of either edge.

It is this flexibility in expansion that enables tape made as I have indicated to follow the contour of smooth, rough, straight, arcuate, hollow, elevated or other irregular surfaces or forms.

Likewise, these characteristics of tape apply to rolls, sheets, strips and other forms of adhesive elements used for various purposes.

What has been said about gummed tapes will now be understood to be applicable to "pressure sensitive," "surgical" and other varieties of adhesives. For "pressure sensitive" tapes various types of "backing" may be used to prevent adhesion of the front of the tape to the back thereof. In most cases these "backings" are removed just before application.

In the case of gummed tape, to facilitate winding on rolls and to prevent the pleats from opening up in the winding process, one or more narrow strips of paper or other material may be affixed to the gummed surface and removed before application or these strips may be gummed also and affixed to the tape with the gummed side exposed so that the strip and the tape adhere simultaneously except where the strips are cut at the pleat lines to permit such expansion as is necessitated by the size, shape, contour, etc., of the article to which the tape is to be applied.

In addition to the flexibility set forth above, it is apparent that the application of tapes such as I have described, provides a stronger seal than an unpleated tape of the same width because the tensile strength is multiplied proportionately to the number and size of the pleats since multiple layers of tape are applied in one operation, thus avoiding the application of several reinforcing layers in several operations, the cost of labor is materially reduced by the use of my type of tape.

Endless variations and modifications in sizes and shapes of my invention may be made to meet various needs, and I herein claim all such variations and modifications insofar as they fall within the reasonable spirit and scope of my claims, although I show only a few examples to disclose my invention.

It should, therefore, be understood that the particular embodiment of my invention disclosed

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herein is illustrative only, that my invention is not limited thereto, and that changes and variations in the size, shape and location of elements, etc., may all be resorted to without departing from the spirit of my invention and the scope of my claims. For to others skilled in the art it will appear from my invention and disclosure that many variations and modifications may be made without copying the specific structure shown, therefore, I claim all such variations and modifications insofar as they fall within the reasonable spirit and scope of my appended claims.

I claim:

1. A binding tape including an elongated strip of material having an adhesive surface and a plain surface, said strip being formed from a plurality of joined sections, each of said sections having opposing convex side edges and straight end edges, the adjoining end edges of the sections being hingedly connected together and each section being formed with a transverse fold line disposed parallel with and in adjacency to one of its end edges, said sections being folded upon their adhesive surfaces at their fold lines and the folded portions being superimposed on the plain surface of adjacent sections.

2. A binding tape including an elongated strip of material having an adhesive surface and a plain surface, said strip being formed from a plurality of joined sections, each of said sections having opposing convex side edges and straight end edges, the adjoining end edges of the sections being hingedly connected together and each section being formed with a transverse fold line disposed parallel with and in adjacency to one of its end edges, said sections being folded upon their adhesive surfaces at their fold lines and the folded portions being superimposed on the plain surface of adjacent sections, said exposed center portions of the side edges of each section being in longitudinal alignment when the sections are in folded relation forming parallel longitudinal marginal strip edges.

3. A binding tape including an elongated strip of material having an adhesive surface and a plain surface, said strip being formed from a plurality of joined sections, each of said sections having opposing convex side edges and straight end edges, the adjoining end edges of the sections being hingedly connected together and each section being formed with a transverse fold line disposed parallel with and in adjacency to one of its end edges, said sections being folded upon their adhesive surfaces at their fold lines and the folded portions being superimposed on the plain surface of adjacent sections, the outer surfaces of the folded portions being flush with the plain surfaces of the sections.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,852,040	Blank	Apr. 5, 1932
1,978,631	Herrlinger	Oct. 30, 1934
2,086,179	Angier	July 6, 1937
2,124,650	Chesster	July 26, 1938
2,156,279	Drew	May 2, 1939
2,339,446	Fiegler et al.	Jan. 18, 1944
2,353,332	Hall	July 11, 1944
2,373,634	Wagner	Apr. 10, 1945
2,402,982	Steenbergen	July 2, 1946