Aug. 22, 1933. W. W. McLAURIN 1,923,837

GUMMED TAPE AND METHOD OF MAKING SAME

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Fig. 1

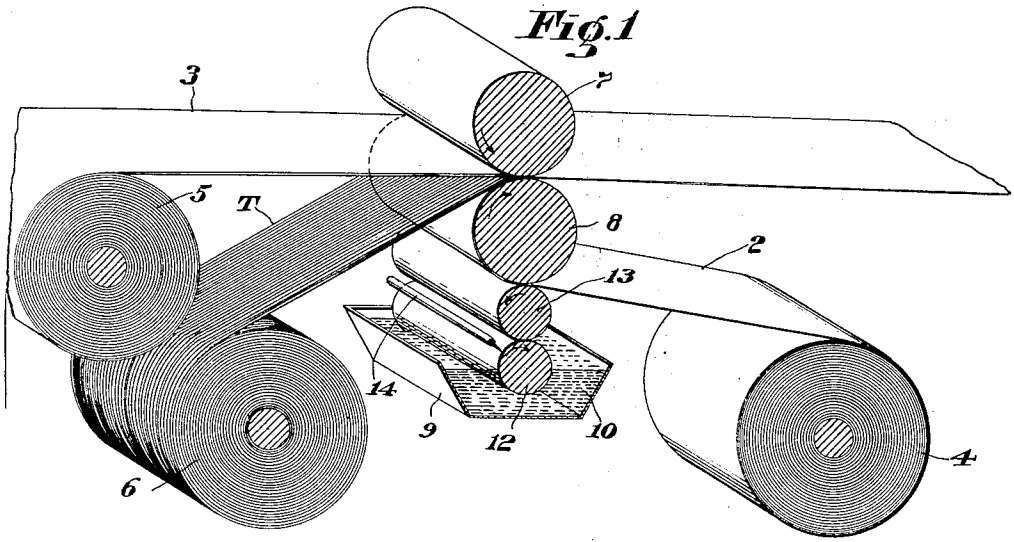


Fig. 2

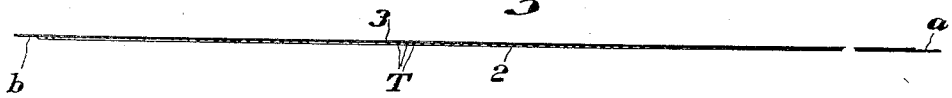


Fig. 3

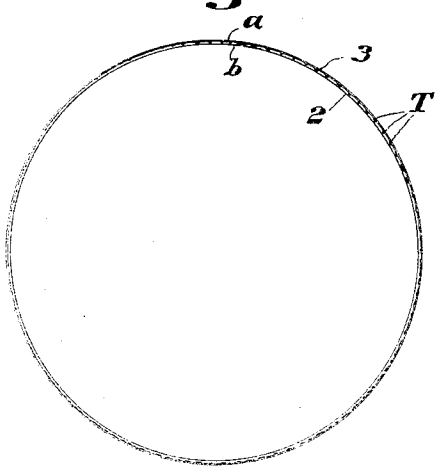
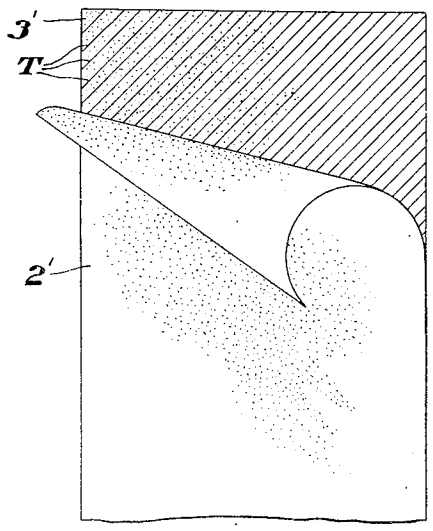


Fig. 4



INVENTOR
William W. McLaurin
BY
J. T. McCready,
ATTORNEY.

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Fig. 5

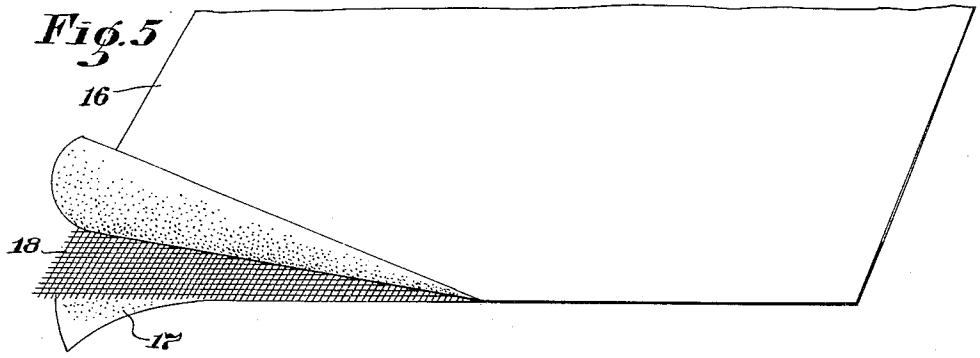


Fig. 6

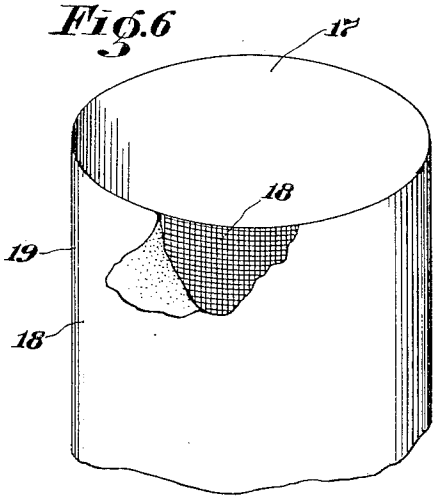


Fig. 7

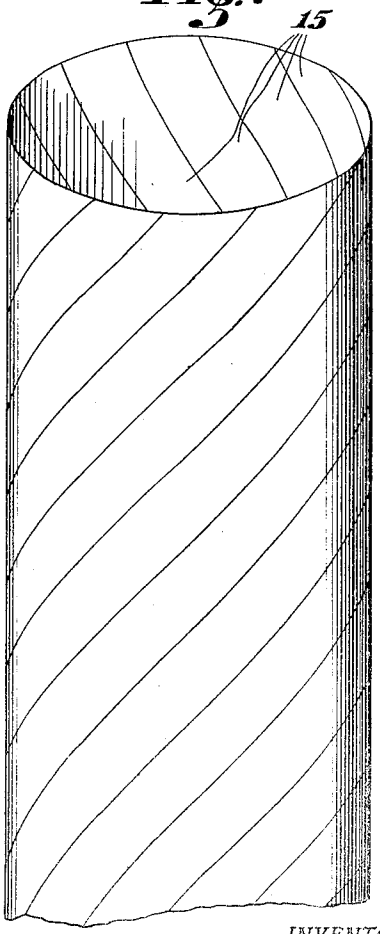
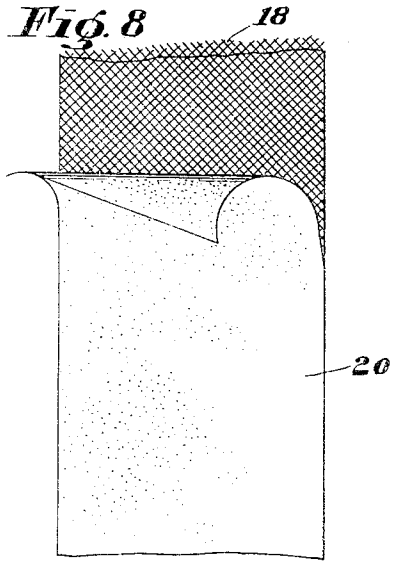


Fig. 8



INVENTOR
William W. McLaurin,
BY
J. P. Cruce,
ATTORNEY.

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UNITED STATES PATENT OFFICE

1,923,837

GUMMED TAPE AND METHOD OF MAKING THE SAME

William W. McLaurin, Brookfield, Mass.; Old Colony Trust Company executor of will of said William W. McLaurin, deceased

Application October 9, 1930. Serial No. 487,450

7 Claims. (Cl. 154—2)

This invention relates to sealing tapes, stay tapes and the like, and to methods of making articles of this character.

Such tapes are widely used for a variety of purposes, such as sealing cartons and packages, reinforcing the edges of paper boxes and cartons and the like. The most common form of this tape consists simply of a strip of strong paper coated on one side with an adhesive. A rather better tape is made from fabric similarly coated, and this kind of a tape is more commonly used in reinforcing cartons and paper boxes. An article much superior to either of these and commonly used also in the manufacture of cartons, is made by slitting a heavy tubular fabric spirally so as to divide it into a series of individual tapes, and subsequently coating these tapes with some form of an adhesive gum. This method produces a tape in which the warp and weft threads of the fabric are diagonally disposed with reference to the edges of the tape, and such a tape often is preferred for the reinforcement of cartons and paper boxes of the better grades.

The present invention aims to devise a relatively inexpensive tape which will have many of the advantages of the so-called "bias cut" tape just mentioned, while being substantially more economical to manufacture. It is also an object of the invention to devise a thoroughly practical method of making such a tape.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a perspective and somewhat diagrammatic view illustrating one step in the present method;

Fig. 2 is a transverse sectional view of the strip or web produced in the step of the process illustrated in Fig. 1;

Fig. 3 is a sectional view illustrating another step in the process;

Fig. 4 is a perspective view showing a section of a finished article;

Fig. 5 is a perspective view showing a product similar to that illustrated in Fig. 2, but embodying the invention in a modified form;

Fig. 6 is a perspective view illustrating another step in the latter method;

Fig. 7 is a perspective view illustrating the spiral slitting of the tube shown in Figs. 3 and 6; and

Fig. 8 is a plan illustrating the product resulting from the use of the material shown in Figs. 5 and 6.

According to one method of procedure, a series of threads are combined with two webs of paper, the threads being located between the paper webs. An apparatus suitable for performing this function is illustrated in Fig. 1, in which the two webs of paper are indicated at 2 and 3 respectively, and are unwound from supply rolls 4 and 5. The assemblage of threads is drawn from a beam 6, the threads travelling in parallel relationship to the bight of the upper and lower rolls 7 and 8 of the combining machine where they come in contact with the two webs of paper. In the particular arrangement shown, a coating of adhesive is applied to the lower surface of the web 2 as it moves toward the bight of the rolls 7 and 8. For this purpose a pan or reservoir 9 is arranged to hold a supply of adhesive 10, and a pick-up roll 12 delivers adhesive from the body 10 to a transfer roll 13 which applies it to the paper web 2, the thickness of the coating being regulated by a doctor or scraper, as is common in machines of this type.

This step of the process therefore results in adhesively uniting the two webs of paper 2 and 3 to each other in a superposed or face-to-face relationship, and securing the threads T between these webs with the threads extending substantially parallel to each other in a definitely spaced relationship and parallel also to the opposite edges of the composite web. Preferably the edges of the paper webs 2 and 3 are not registered exactly with each other, but are offset slightly as shown in Fig. 2, so that a narrow margin *a* of the lower web 2 is exposed at one edge of the combined web, and a similar margin *b* of the upper web 3 projects beyond the edge of the web 2 at the opposite side of the sheet.

The composite web produced in the manner just described, is next rolled into the form of a tube. This operation may conveniently be performed by turning the opposite margins *a* and *b* (Fig. 2) upwardly, and bringing them together with the margin *a* overlapped upon the margin *b*, the two margins being adhesively secured together. Tubing machinery is available or can readily be adapted for performing this operation.

The tube produced in this manner next is slit spirally or in a direction diagonally disposed with reference to the threads. This spiral slitting may either divide the tube into a series of relatively narrow strips 15 (Fig. 7), or it may simply result in producing a single strip which can be wound up and later cut in one of the more com-

mon forms of slitting machines to produce narrower strips of the desired widths. The spiral slitting may be performed in the machines used in producing the "bias cut" tape above referred to. Usually it is preferable to make a single cut only in the tube in this machine, thus producing a relatively wide bias cut strip which is rolled up and is subsequently cut in a common form of slitting machine to produce individual tapes. This machine may be equipped with rolls or other apparatus for gumming or applying adhesive to the individual strips of tape. From the slitting machine the tapes travel over or through suitable dryers to harden the adhesive, and they are then wound up in coils each containing a measured length of tape.

A short section of tape manufactured in this manner is shown in Fig. 4, the gum or adhesive applied to one of the paper strips being indicated by the stippled surface. In this figure one strip 2' of the web 2 is shown pulled back leaving the threads T exposed. It will be seen that due to the relation between the direction in which the cutting or slitting operation has been performed with reference to the direction of the threads T, the threads are diagonally disposed in the tape and extend completely across it from one edge to the other. This method therefore produces a tape which is strengthened by the reinforcing threads, and which, because of the diagonal disposition of these threads, has many of the advantages of the higher grade bias cut tape previously referred to.

The tape shown in Fig. 4 has threads extending in one direction only. If it is desired to have threads extending crosswise of those shown in Fig. 4, the process above described is modified by substituting a roll of fabric for the thread beam 6 in Fig. 1. Usually an open mesh inexpensive fabric is used for this purpose, such, for example, as cheese cloth. Fig. 5 illustrates the structure of a composite sheet produced in this manner having upper and lower plies 16 and 17 of paper adhesively united to each other and to an intermediate ply 18 of open mesh coarsely woven fabric. A tube made from such an assembly of plies is shown at 19 (Fig. 6). In order to avoid the presence of a heavy overlap, the margins of the webs or plies 16 or 17 may be offset in the manner shown in Fig. 2. This tube later may be slit spirally as shown in Fig. 7, or a single diagonal slit may be formed in it to produce a wide strip which later is cut into relatively narrow strips, one of these strips being shown at 20 in Fig. 8. In this modification of the process also, the narrow strip or the wider one from which it is made, has a coating of adhesive applied to one surface thereof at some stage in the process of manufacture, so that each strip of tape when completed has one gummed surface exposed for application to the carton, box or package to which it is to be affixed. In the tape shown in Fig. 8, however, the two sets of threads corresponding respectively to the warp and weft of the fabric 18, are disposed diagonally with reference to the edges of the tape, one set of threads crossing the other, and the individual threads of each set being spaced apart and lying parallel to each other.

This method permits the manufacture of paper tape reinforced with diagonally disposed threads by machinery which is capable of handling material rapidly and in large quantities, so that the expense of manufacture is maintained within entirely reasonable limits. At the same time it produces a tape of a cheaper grade which has many of the advantages of the more expensive bias cut tape which has been used heretofore.

While I have herein shown and described typical embodiments of my invention and preferred methods of manufacturing this novel product, it will be understood that the invention is not limited to the precise details of the disclosures made, and that these as well as the particular products shown may be made by other methods without departing from the spirit and scope of the invention.

Having thus described my invention, what I desire to claim as new is:

1. That improvement in processes of manufacturing reinforcing and sealing tape which consists in adhesively securing a series of threads to a web of paper with the threads running approximately parallel to the edges of the web, making a tube from the paper so reinforced, and then slitting the tube in a direction diagonally disposed with reference to said threads.

2. That improvement in processes of manufacturing reinforcing and sealing tape which consists in adhesively securing a series of threads spaced apart and to a web of paper with the threads running approximately parallel to the edges of the web, making a tube from the paper so reinforced, then cutting the tube in a direction diagonally disposed with reference to the threads to divide said tube into one or more strips, and at some stage of the process coating one surface of each strip so formed with an adhesive.

3. That improvement in processes of manufacturing reinforcing and sealing tape which consists in adhesively securing a series of threads to a web of paper with the threads running approximately parallel to the edges of the web, overlapping the opposite edges of said web one upon the other and securing them in said overlapping relation to form a tube in which said threads run approximately parallel to the tube, and then slitting the tube spirally.

4. That improvement in processes of making reinforcing and sealing tape which consists in combining threads between two webs of paper, one superposed on the other, and adhesively securing said webs together with the threads between them and with the margin of one web offset relatively to the other, overlapping the opposite offset margins of the webs one upon the other and securing them together to form a tube, and then slitting the tube spirally.

5. That improvement in processes of making reinforcing and sealing tape which consists in combining approximately parallel spaced threads between two webs of paper, one superposed on the other, and adhesively securing said webs together with the threads between them and with the margin of one web offset relatively to the other, overlapping the opposite offset margins of the webs one upon the other and securing them together to form a tube, then cutting the tube in a direction diagonally disposed with reference to said threads and dividing the tube into a plurality of independent strips, and at some stage in the process applying a coating of adhesive to the outer surfaces of said strips.

6. That improvement in processes of manufacturing reinforcing and sealing tape which consists in adhesively securing a web of woven fabric to the surface of a web of paper with one set of the threads in said fabric running approximately parallel to the edges of said web of paper,

making a tube from the paper so reinforced, then cutting the tube in a direction diagonally disposed with reference to said threads and to the edges of said web of paper to divide the material of said tube into one or more flat strips, and at some stage of the process coating one surface of each strip so formed with an adhesive.

7. That improvement in processes of making reinforcing and sealing tape which consists in combining a woven fabric between two webs of paper, one superposed on the other, and adhesively securing said webs together with the fabric between them and with one set of the threads of said fabric extending approximately parallel to the edges of said webs of paper, so controlling said webs of paper during said combining operation that both margins of one web will be offset relatively to the adjacent margins of the other web, overlapping the opposite offset margins of the webs one upon the other and securing them together to form a tube, cutting the tube so formed in a direction diagonally disposed with reference to said threads and said offset margins to form one or more flat strips, and at some stage in the process applying a coating of adhesive to the outer surface of each strip so formed.

WILLIAM W. McLAURIN.