Nov. 13, 1945. M. KATZ 2,388,745

PAPER TWINE AND THE METHOD OF PRODUCING THE SAME

Filed March 26, 1943

Fig. 1a.

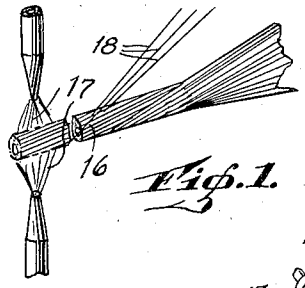


Fig. 1.

Fig. 3.

Fig. 2.

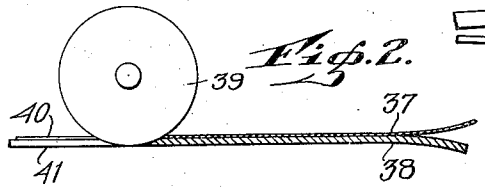


Fig. 4.

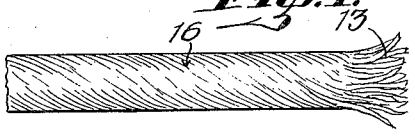


Fig. 5.

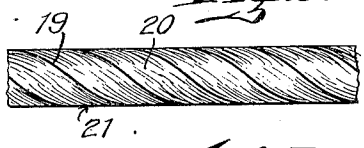


Fig. 6.

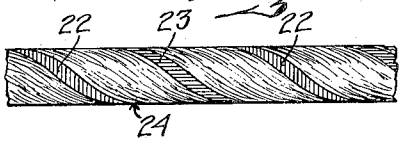


Fig. 7.



Fig. 8.

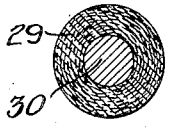


Fig. 9.

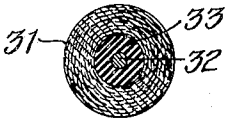
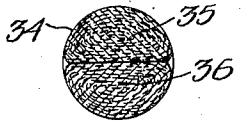


Fig. 10.



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PAPER TWINE AND THE METHOD OF PRODUCING THE SAME

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2 Claims. (Cl. 57—155)

This invention relates to twine, particularly of the kind usually formed from hemp and generally referred to as sisal and henequen. The object of the invention is to construct twine of the kind under consideration from a multiplicity of paper strands or strips twisted together to form the resulting twine, and further to a method of producing twine of the kind under consideration in a more or less continuous process, starting with the slitting of a wide strip of craft or other paper in forming the multiplicity of strands used in producing a resulting twine of the desired size thickness and strength.

The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic view illustrating steps which may be employed in the production of a paper twine according to my invention.

Fig. 1–*a* is a view similar to Fig. 1, showing only a part of the construction and showing a modification.

Fig. 2 is a diagrammatic view illustrating the formation of twine from paper strips of different thickness or texture.

Fig. 3 is a view similar to Fig. 2 showing the slitting of two strips to form, in one instance wide strands, and in the other instance narrower strands, the two being collectively employed to form the resulting twine.

Figs. 4 to 7 inclusive are side elevations diagrammatically illustrating different productions of twine according to my invention, and

Figs. 8, 9 and 10 are cross sectional views diagrammatically showing other modified structures which may be employed in producing various twine.

In the construction of twine made from hemp, the resulting product has been quite expensive, and further has been objectionable, particularly in the use of certain kinds and classes of hemp by reason of the stiffness in the resulting twine and the problem of securely tying a package with the twine. Further, this type of twine has been objectionable from a standpoint of being hard on the hands, particularly when used by professional wrappers who handle the twin throughout the entire day.

It is the purpose of my invention to provide not only an extremely economical twine product, but one which will have greater flexibility, more secure tying properties, and one which will be less injurious to the hands by virtue of its soft texture.

In certain adaptations and uses of the invention, the paper employed will be of a type and kind prepared or treated to permit of wetting or saturation thereof prior to twisting of the strands in producing the resulting twine. In other words, the paper will not be weakened by the wetting operation, and further this paper may be said to have water repellent properties. At this time, it is well to point out, however, that in producing twine or cords of different kinds and classes, different papers may be used, so long as the paper will withstand the processing essential to the production of the resulting twine or cord.

In Fig. 1 of the drawing I have diagrammatically illustrated the general methods of producing either an all paper twine, paper twine plus added strandlike or striplike elements or a paper twine having final protective or other coatings. In this figure 11 represents a wide strip of paper, the width of which will determine the bulk or diameter of the resulting twine to be formed. This strip coming from a roll, first passes beneath a plurality of closely placed cutting or slitting devices 12, which may be in the form of disc knives, to cut the major portion of the width of the strip 11 into a multiplicity of narrow strandlike strips 13.

The marginal edge portions 14 may be retrieved in any way, and this can be used for other purposes, such for example, as wide band wrappings on the resulting cord, as later described, or in forming twisted paper cord used as core members in the resulting twine.

The strands 13 are then passed through a moistening or saturation bath 15, which may simply moisten the paper strands or may apply a suitable treatment or coating to these strands, depending upon the results desired in the finished products, after which the moistened strands are twisted to form the resulting cord or twine 16.

The above describes what might be termed the simplest method of procedure where a single paper strip is cut to form the strands, then moistened, saturated, or otherwise treated and then twisted. After twisting, the cord or strand is allowed to dry, or this drying may be forced by passing the same through dryers, after which the cord may be wound on suitable spools or into balls, as is the conventional practise with other cord and twine products.

In some uses, that is to say, in the production of some types of twine or cord, the same may be

sprayed or otherwise coated to color or ornament the same, to render the cord or twine bug and mildewproof. In the latter instances, the desired type and kind of chemicals can be employed, or tar or wax coatings may be used.

At 17 in Fig. 1 of the drawing is indicated the application of the various coatings by spraying for the purposes of illustrating one method of procedure, and this treatment preferably takes place after the cord or twine has become dry.

In Fig. 1–a of the drawing is indicated at 18 the possibility of introducing other strands, strips or the like, with the strands 13 prior to the twisting operation, or these strips may be introduced at any stage, depending largely upon the type and kind of material employed in the strand or strips, and further the intended purpose thereof.

In Fig. 5 of the drawing the strands 19 are shown in conjunction with the paper strands 20 in producing a resulting cord or twine 21, and the strands 19 may comprise a predetermined number of hemp strands of the kind mentioned associated with the paper strands to give added strength to the resulting cord or twine. On the other hand the strands 19 may be composed of wire, tensel, cotton, wool, silk, Cellophane, and many other types and kinds of plastic materials. Inclusion of the wire will adapt the resulting twine to many uses, some of which may be electrical uses, whereas the inclusion of plastic strands would be used for purposes of branding or ornamentation, except where such strands would possess greater strength than the paper strands employed.

In the diagrammatic illustration of Fig. 5 the strands 19 are shown in more or less regular arrangement, but it will be understood that in many instances these strands will have an irregular arrangement throughout the length of the resulting cord or twine. The illustration is simply to indicate in conjunction with the paper twine which incorporated the added strands 19 and the ratio of the number of such strands in proportion to the paper strands may be varied to suit the requirements in the finished product. While in most cases the number of strands 19 will be less than the strands 20, in some instances they may be equal to, or even greater than, the number of strands 20 employed.

In Fig. 6 of the drawing is shown the inclusion of striplike members 22 with the paper strands 23 in producing the resulting cord or twine 24. These strip members may have the same structure and characteristics as the strands 19, that is to say, they may be fibrous, plastic or metallic, and further, may have different colors, as is indicated by the cross hatch, appearing on the strands 22 shown. The strands 22 may be said to be ribbonlike members and may also comprise paper strands or strips, and in this respect the side cuttings as at 14, Fig. 1, may be used.

In Fig. 7 of the drawing is shown another adaptation of the invention which incorporates the teachings of Fig. 5 with the teachings of Fig. 6. That is to say, the cord or strand 25 here diagrammatically illustrated will comprise paper strands 26, strands 27 similar to the strands 19, and strips or bands 28 similar to the strips or bands 22.

At this time it is also well to consider the structures diagrammatically illustrated in Figs. 8, 9, and 10 of the drawing which show adaptations of the invention which may be incorporated with the cord or twine shown, for example, at 16, 21, 24 and 25. In Fig. 8, any one of the above cords or strands is generally identified by the reference character 29, and within this strand is incorporated a core 30 of any suitable or desired material. This core may comprise a small diameter twine composed of hemp, or the hemp products mentioned heretofore. On the other hand, it might comprise simply a twisted paper cord, that is to say, a cord produced by the use of a wide ribbonlike strip of paper, which is simply twisted in the production of a cordlike strand. In some further uses, the core 30 may comprise such materials as are employed in the strand 19 of Fig. 5, and used solely as a core, rather than as a strand member incorporated in the environment of the entire twisted strand body.

In Fig. 9 is shown generally by the reference character 31 a cross section of any one of the cords or twine shown in Figs. 4 to 7 inclusive, in conjunction with which is incorporated a two part core comprising an inner strand 32 enveloped in a jacket 33. In such instances, the inner strand 32 will comprise a metal wire or a cord or strand of any strong and durable material, whereas the jacket 33 may comprise a wrapping of paper or any of the other materials mentioned. In some instances, particularly in the use of wire elements 32, the jacket 33 may comprise a rubber or other homogeneous mass, forming a complete enclosure and protective covering for the wire, as well as an insulation therefor.

In Fig. 10 of the drawing is shown a cross section of what is generally referred to as heavy cord or rope 34, and this is composed of two of the cords or twine, indicated at 35 and 36, which are twisted together in conventional manners in forming the resulting heavy cord or rope 34. In some forms of rope production, more than two strands are employed, however, the two strands 35, 36 are sufficient to illustrate this adaptation and use of the invention, and it is applicable to any of the types and kinds of twine disclosed in Figs. 4 to 9 inclusive.

Where the additional strands or strips are employed, as for example, at 19, 22, 27 and 28, these may be included in dry state or in saturated or otherwise treated state. In dealing with some types and kinds of plastics, the moisture of the original paper strands may be sufficient to moisten the plastic strip or strand by coming in contact with the paper strips or strands. This will also be true in instances where other paper strips or strands are added to the initial paper strips or strands.

In addition to forming the paper strip or strand body of the several cords or twine disclosed in Figs. 4 to 10 inclusive, these bodies may be constructed from two strips or sheets of paper instead of the single sheet, as at 11 in Fig. 1 of the drawing. In Fig. 2 is shown one method of procedure where one strip is shown at 37, and another strip at 38. The strip 37 is shown thinner than the strip 38, primarily to indicate a difference in these strips, and this difference may be a matter of texture or kind of paper employed, and not necessarily a thicker and thinner paper. In fact, one strip may be paper and the other strip may constitute a totally different material, for example, it may comprise a strip of Cellophane or similar plastic material.

In the diagrammatic illustration of Fig. 2, both of these strips are simultaneously passed through one series of cutters, indicated at 39 to form of each of the strips 37, 38 multiplicity of strands 40, 41 respectively. If both strands 40, 41 are to be saturated, they will both be passed through

the bath as at 15, and then twisted, and additional strand or strip products may be added, as at 18, and the resulting products further treated or coated, as at 17. In some instances, however, one of the strands 40—41 may be left untreated or unsaturated, and the other of said strands will be saturated or treated, as indicated above.

The above method of procedure is also applicable to the process which is diagrammatically illustrated in Fig. 3 of the drawing. Here again two strips 42, 43 are employed, and these strips are passed through independent cutters 44 and 45 respectively so that, for example, the strip 42 could be cut into a plurality of wide ribbonlike strands 46, and the strip 43 into narrow strips 47. The narrow and wide strands 46, 47 may be collectively twisted in forming the resulting cord or twine product.

The strips 42, 43 may have the same or identical characters, or as is taught in connection with the description of Fig. 2 these strips may have slightly or totally different characteristics. In some instances, and particularly when the strips 42, 43 have different characteristics, the cutters 44, 45 may be of the same general spacing, but will perform independent cutting or slitting operations on their respective strips. In some instances, this will be desirable, particularly in that different types of cutters may be needed in cutting or slitting different materials.

It will be understood that in the accompanying drawing the size of the resulting strands cut from the paper strips are exaggerated in order to simplify the showing, the illustration being simply diagrammatic to indicate the method of procedure. It will also be apparent that the illustration of the added strands 18 or strips in Fig. 1–*a* need not necessarily be outer wrappings, as these strands may be introduced in the twist, and constitute part of the body of the resulting cord or rope, particularly when these strands constitute reinforcing members. From this standpoint, the illustrations in Figs. 5, 6 and 7 of the drawing are to indicate the incorporation of the additional members, and not simply as surface mountings or wrappings. In the resulting product some of these strands or strips are bound to appear on the surfaces.

Throughout the specification and in the claims, reference is made to the use of a multiplicity of strands, and it has been stated that the illustration in Fig. 1 of the drawing is purely diagrammatic and does not necessarily indicate the number of strands employed in forming a twisted cord or twine. The practise in average twine will comprise twenty or more of the narrow paper strands, and in some instances may run into several hundred. The use of the term "multiplicity" is to imply that a large number of these strands are employed and not what might be simply regarded as a plurality which might be considered as two, three or a minimum number. Considering Fig. 1 of the drawing, it will appear that the strands are maintained in their normal state and are simply twisted together in forming the cord or twine and by maintaining the normal relationship of these strands, the resulting cord or twine is, as stated, soft and flexible and facilitates tying of the cord and strand into firm knots.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A cord product of the class described comprising a twine body, said body being composed of fine paper strands twisted together in forming said twine, other members incorporated with and bound in said paper strands, and one of said members comprising a strip of greater width than the width of said paper strands.

2. The method of producing twine which comprises slitting a paper strip to form a multiplicity of fine paper strands, moistening said strands, then twisting the moistened strands, then spirally wrapping thereon a ribbonlike strip and an additional strand in forming a cordlike body, and then drying said body in producing the resulting twine.

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