June 11, 1940. E. HYMAN 2,203,822

RIBBON

Filed July 25, 1935

Fig. 1

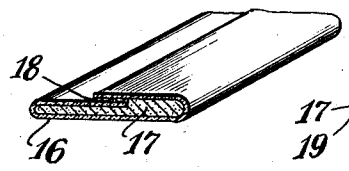


Fig. 2

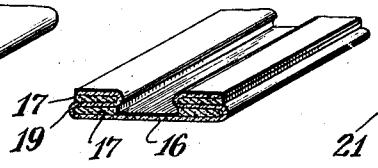


Fig. 3

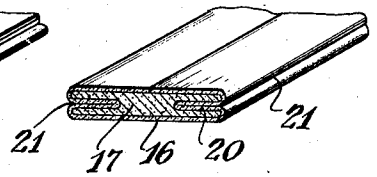


Fig. 4

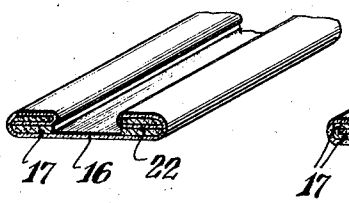


Fig. 5

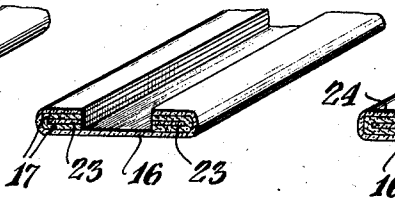


Fig. 6

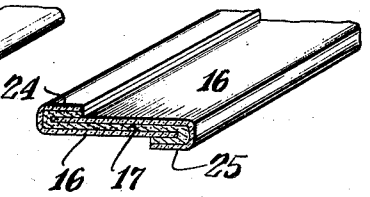


Fig. 7

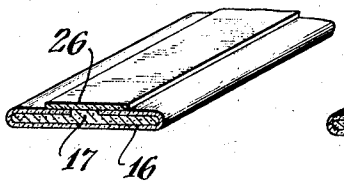


Fig. 8

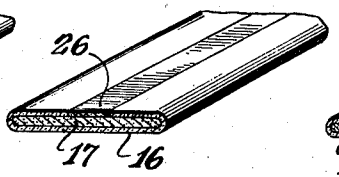


Fig. 9

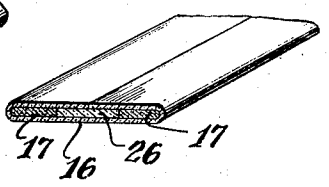


Fig. 10

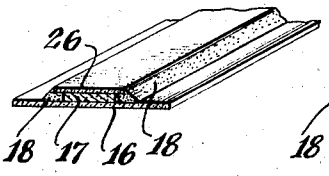


Fig. 11

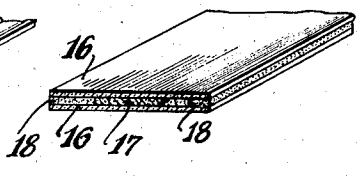


Fig. 12

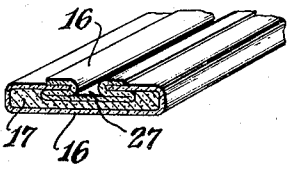


Fig. 13

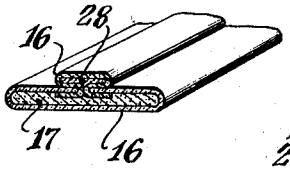


Fig. 14

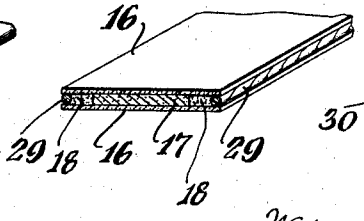
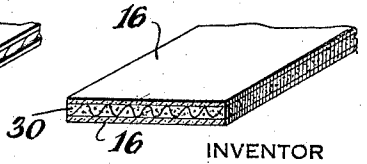


Fig. 15



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Patented June 11, 1940 2,203,822

UNITED STATES PATENT OFFICE

2,203,822

RIBBON

Eli Hyman, Brookline, Mass.

Application July 25, 1935, Serial No. 33,045

5 Claims. (Cl. 154—43)

This invention relates in general to ribbon-like strips adapted for use in the textile and cordage arts, and in particular to an improved tying ribbon comprising a strip of non-fibrous flexible material.

The ribbons heretofore formed from strips of non-fibrous flexible material have been characterized by such stiffness and inflexibility as to give rise to numerous disadvantages when used in the textile and cordage arts. Chief among these disadvantages is that the stiffness and inherent springiness of the non-fibrous material make it difficult to tie the ribbon into a knot. Another disadvantage arises from the fact that the ribbon, when folded, tends to bend sharply at a single point instead of over a considerable area, and thus has few characteristics in common with woven ribbons made of textile fibers which, of course, are capable of flexing in all directions and which lie flat when bent or knotted.

The inherent stiffness of the ribbon of the prior art is not overcome by increasing the amount of plasticizer which is normally incorporated in non-fibrous sheet material. The reason for this lies in the fact that there is an upper limit to the amount of plasticizer which can be incorporated in non-fibrous sheet material without rendering the surface of the material permanently tacky. If the sheets are permanently tacky, the contiguous surfaces stick together when rolled and hence cannot be fed continuously through an automatic folding machine. Moreover, it would be objectionable to have a ribbon the surface of which was inherently tacky, as this would tend to soil the hands and damage the goods bound by the ribbon.

It is a general object of the present invention to provide a ribbon formed from a sheet of non-fibrous material which shall have substantially the characteristics of a ribbon woven from textile filaments.

It is another object of the invention to provide a colored ribbon formed from a strip of non-fibrous sheet material and characterized by a new and novel decorative effect resulting from variations in the color of the strip.

It is a specific object of the invention to provide a tying ribbon formed from a strip of non-fibrous sheet material and which is characterized by having a high flexibility and lack of springiness, whereby the ribbon can be used in the textile and cordage arts with the facility of ribbons woven from textile filaments.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

According to the invention, a ribbon adapted for use in the textile and cordage arts may be formed from a sheet of non-fibrous material which has been slit into narrow bands or strips, the ribbon being formed from a single strip folded lengthwise upon itself or from a plurality of strips at least one of which is non-fibrous, the strips being laminated together and/or folded about each other so as to form superimposed plies. The ribbon of the invention is further characterized by having a layer comprising a plasticizer disposed between the superimposed plies of the material formed by folding or laminating, which plasticizer imparts to the strip a permanent flexibility and tends to decrease the inherent stiffness and springiness of the non-fibrous material. A ribbon having novel multiple-tone color effects may be produced by starting with a colored sheet material, variations in shade and color resulting from the folding of a strip of the colored sheet material or from an association of two or more strips having different colors.

For a more complete understanding of the nature and objects of the invention reference should be had to the accompanying drawing, in which

Figures 1 to 4 inclusive represent as many embodiments of the ribbon of the invention formed from a single strip of non-fibrous material;

Figures 5 to 13 inclusive represent as many embodiments of the ribbon of the invention formed from a plurality of strips of non-fibrous material; and

Figures 14 and 15 represent two embodiments of the ribbon of the invention in which there is employed an extraneous strengthening material in association with strips of non-fibrous material.

The ribbon of the invention is formed of at least one strip of a non-fibrous material. The non-fibrous material may be a material swelling in water, such, for example, as regenerated cellulose; alkali-soluble cellulose ethers and cellulose oxy-ethers, gelatine, casein, and the like; or the non-fibrous material may be a material swelling or dissolving in organic solvents but not swelling in water, such, for example, as cellulose esters, cellulose ethers and cellulose ester-ethers, synthetic plastics such as polymerized vinyl resins, chlorinated rubber, and the like. The sheet material is preferably transparent and may be colored, embossed, printed, metallized, and/or provided with a waterproof coating.

A layer comprising a plasticizer is disposed between any or all of the continguous surfaces present in any of the embodiments of the ribbon of

the invention shown in the several figures of the drawing. The plasticizer employed is characterized by being a non-drying flowable at ordinary temperature and pressure, composition which may swell but does not dissolve the non-fibrous material. Suitable plasticizers for non-fibrous materials swelling in water comprise the polyhydric alcohols, such for example as glycerol; the glycols; the glycol ethers, such as diethylene glycols.

With the non-fibrous materials swelling in water it is preferable to use a plasticizer which is hygroscopic whereby to maintain the flexibility of the material. When the ribbon is formed from strips of non-fibrous materials which are dissolved or swell in organic solvents but not in water, there may be employed between the plies a layer of a non-hygroscopic plasticizer, such for example as tricresyl phosphate, dibutyl phthalate, and esters of keto-aromatic acids.

The plasticizers may be used singly or in compatible admixtures with each other. Interesting decorative effects may be produced in the article of the invention by employing a plasticizer which is colored or which is admixed with a coloring material. The colored plasticizer will impart an additional color or will modify a colored strip material when used therewith, so as to produce a ribbon having a two-tone or variegated color effect. For example, the colored plasticizer may be applied to an enclosed surface of the ribbon as a narrow strip running lengthwise of the ribbon so as to give a striped effect.

The plasticizer is used preferably in the form of a thin layer disposed between the contiguous surfaces of one or more of the superimposed plies in the ribbon. The plasticizer may be disposed between the plies in a continuous layer throughout the length of the ribbon or in predetermined areas at suitable spaced intervals.

Referring to Fig. 1, a simple embodiment of the article of the invention comprises a single strip **16** of the non-fibrous material which is folded upon itself lengthwise thus forming a narrow ribbon having superimposed plies and having disposed between the plies a layer **17** comprising the plasticizer for the non-fibrous material. Ordinarily the surface tension of the plasticizer will be sufficient to hold the overlapping plies in position, so that no adhesive is required between the plies. However, if desired, a layer **18** of adhesive may be disposed between all or a portion of the contiguous surfaces, for example as shown in Fig. 1.

The manner in which the strip is folded to form a ribbon may be varied as desired but in the preferred embodiment of the invention the strip is so folded that the number of plies is not the same transversely of the ribbon, that is, throughout the width of the ribbon. This inequality in the number of layers of material imparts to the ribbon a new and novel diversity of decorative effects. For example, in Fig. 2 the longitudinal edges of the strip **16** are folded first inwardly toward each other and then outwardly to give the S-shaped fold **19**. Alternatively, the strip **16** may be taken of sufficient width to form a structure as shown in Fig. 3 having a double reverse fold **20** which produces pleats **21** in each edge of the ribbon. In this ribbon the plasticizer may be disposed in the interior of the ribbon only, and/or in the pleats. The ribbon shown in Fig. 4 may be formed by folding the longitudinal edge of the strip **16** twice upon itself or by coiling the edge and flattening the coil to form the double fold **22**. The plasticizer may be disposed between any of the contiguous surfaces of any of the folds of the ribbons shown in Figs. 1–4.

In another embodiment of the invention a ribbon is formed from a plurality of strips which are folded or laminated together. When the ribbon is formed from a plurality of strips, the strips may be of the same width, as shown in Figures 6, 11, 14 and 15, or they may be of different widths, as in the structures shown in Figures 5, 7, 8, 9, 10, 12 and 13.

For example, the longitudinal edges of a wide strip **16** may be folded inwardly to form a narrow fold so as to leave the major portion of the strip consisting of a single thickness of material. There may be disposed within the folded portions an insert **23**, as shown in Fig. 5. This insert **23** may comprise a narrow strip or band of fibrous or non-fibrous material which may be colored, embossed, or otherwise decorated.

To form the ribbon shown in Fig. 6, two strips **16, 16** of the same width are disposed one upon the other with their longitudinal edges slightly offset. The overhanging edge of each strip is then folded about the inner edge of the other strip. If the two strips forming the ribbon shown in Fig. 6 are of different colors, the ribbon will have a novel three-tone color effect due to the fact that the central portion of the ribbon comprises two layers, one of each color, whereas the lefthand edge **24** of the ribbon comprises two layers of one color and one layer of the other while the righthand edge **25** comprises one layer of the first color and two layers of the second.

A ribbon having an interesting two-tone color effect may be produced by forming the ribbon of two strips one of which is narrower than the other and disposing the narrower strip central of the wider strip. The wider strip **16** is folded upon itself and the narrow strip **26** laid lengthwise over the seam formed by the edges of the strip **16**, as shown in Fig. 7. Or the narrow strip **26** is disposed in the same plane and between the folded edges of the wider strip **16**, as shown in Fig. 8. In a third example of this type of ribbon the narrow strip **26** is disposed beneath the seam formed by the edges of the wider strip **16** and interiorly of the ribbon, as shown in Fig. 9.

If the strengthening of the ribbon is not a material consideration, the wider strip **16** need not be folded at all but may be laminated with the narrow strip **26** centrally disposed thereon, as shown in Fig. 10. In this latter embodiment the layer **17** comprises preferably both an adhesive and a plasticizer and, if desired, an adhesive deposit **18** may occupy the angle between the strips **16** and **26**.

In all the embodiments shown in Figs. 7, 8, 9 and 10, it is preferred that the narrow strip **26** be of a color different from that of the wider strip **16**. The ribbon so produced will have variations in color and variations in the shade of a single color depending upon the position of the narrow strip **26**, the number of folds produced in the wider strip **16** and the extent to which these folds overlap the narrow strip.

When the ribbon comprises a plurality of strips **16—16** of the same widths, two such strips may be laminated together to form a structure as shown in Fig. 11. A layer **17** of plasticizer is interposed between the strips **16, 16** and when desired the layer may include adhesive **18** at the edges of the strips. If desired, one of the plurality of strips **16—16** may have its longitudinal edges folded and another strip having the same

or a different width may be folded between the seam formed by the edges of the strip 16 so as to form a gusset 27, as shown in Fig. 12, or so as to form a piping or beading 28, as shown in Fig. 13.

In Figs. 14 and 15, the two strips 16, 16 comprising the ribbon enclose an insert of extraneous material which serves to strengthen the ribbon. In Fig. 14 the insert comprises single textile filaments 29, 29 disposed between the two strips longitudinally and adjacent the edges thereof. The filaments 29, 29 may be held in position by a layer 18 of an adhesive which is applied to the edges of the strips 16, 16 or to the filaments 29, 29 either before or during the formation of the ribbon. In another embodiment of the article, the insert comprises an open mesh textile fabric cut into a strip 30 having a width not greater than the width of the non-fibrous strips 16, 16. The textile strip 30 is laminated between two strips 16, 16 of non-fibrous material to form a ribbon such as that shown in Fig. 15. It is to be understood that the inserts of extraneous material may be of the same color as, or of a different color from, the non-fibrous strips, so as to impart a decorative effect by augmenting or contrasting with the color of the non-fibrous material. The extraneous inserts may be held in position by means of non-drying plasticizer and/or by the use of an adhesive.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

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

1. As a tying ribbon, a narrow band of non-fibrous organic film material comprising superimposed plies and a separate layer consisting of a non-drying, permanently tacky, flowable at ordinary temperatures and pressures plasticizer for said material disposed between said plies to cause the plies to adhere and to maintain the ribbon in a permanently flexible condition.

2. As a tying ribbon, a narrow band of non-fibrous organic film material comprising superimposed plies formed by folding the material longitudinally and a separate layer consisting of a non-drying, permanently tacky, flowable at ordinary temperatures and pressures plasticizer for said material disposed between said plies to cause the plies to adhere and to maintain the ribbon in a permanently flexible condition.

3. As a tying ribbon, a narrow band of non-fibrous organic film material comprising superimposed plies formed by folding the material longitudinally in such a manner that the number of plies is not the same throughout the width of the ribbon, and a separate layer consisting of a non-drying, permanently tacky, flowable at ordinary temperatures and pressures plasticizer for said material disposed between said plies to cause the plies to adhere and to maintain the ribbon in a permanently flexible condition.

4. As a tying ribbon, a narrow band of non-fibrous cellulosic material comprising superimposed plies and a separate layer consisting of a non-drying, permanently tacky, flowable at ordinary temperatures and pressures plasticizer for said material disposed between said plies to cause the plies to adhere and to maintain the ribbon in a permanently flexible condition.

5. As a tying ribbon, a narrow band of regenerated cellulose comprising superimposed plies and a separate layer consisting of a non-drying, permanently tacky, flowable at ordinary temperatures and pressures plasticizer for said material disposed between said plies to cause the plies to adhere and to maintain the ribbon in a permanently flexible condition.

ELI HYMAN.