Nov. 12, 1968 R. F. GOODWIN 3,409,948

TIE STRIP

Filed Feb. 8, 1968

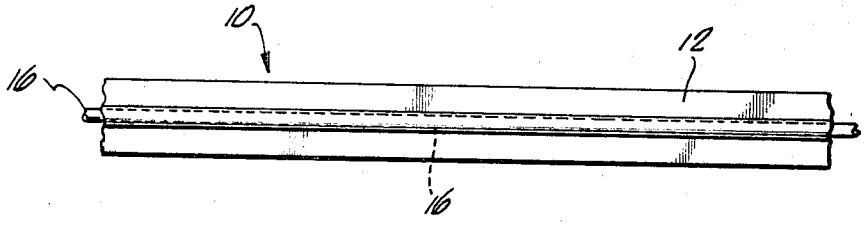


FIG. 1

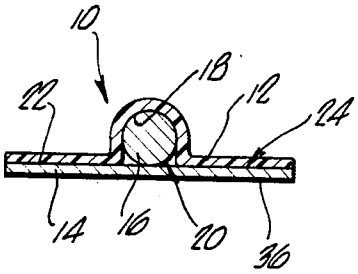
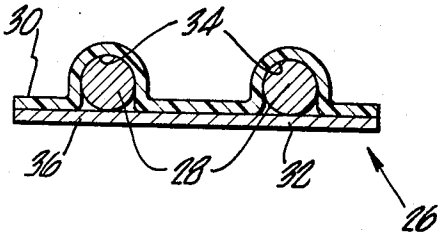


FIG. 2

FIG. 3



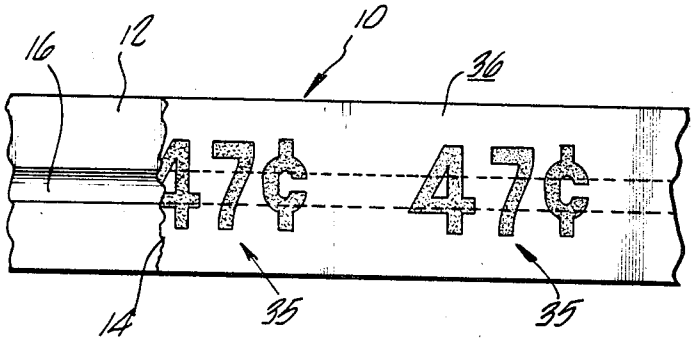


FIG. 4

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TIE STRIP

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ABSTRACT OF THE DISCLOSURE

A tie strip having a paper ribbon, a plastic ribbon, and a wire disposed between the ribbons. A face of the paper ribbon adjacent the plastic ribbon includes a bonding agent and the exterior of the wire has a cementitious coating to bond the parts together. The wire is disposed in a channel defined by the plastic ribbon. An outer surface of the paper ribbon is flat to enable its imprinting even after the tie strip has been formed.

BACKGROUND OF THE INVENTION

Field of the invention.—This invention relates to apparatus for tying articles and more particularly to ties constructed of different materials which are sandwiched together in a manner permitting the imprinting of an exterior surface of the tie.

State of the prior art.—The prior art knows a large variety of different tie materials. They include strings, wires, adhesive tapes, etc. More recently, ties having a pair of plastic ribbons bonded together and a wire disposed between the ribbons have become widely accepted. Such a tie is shown and described in U.S. Patent 2,767,113. It is also known to make tie strips out of sheets of paper which are suitably bonded together and have a wire sandwiched therebetween. U.S. Patent 3,068,135 discloses such a tie.

The tie shown in Patent 2,767,113 includes a large number of desirable features. Most importantly, it is attractive and thus ideally suited for merchandising, it is easily handled and adapted to be dispensed in automatic tying machines, and it is heat, water, and generally weather resistant. The wire disposed between the plastic ribbons gives the tie the necessary strength and permits its use for tying even large articles. The plastic ribbons give it its appealing appearance.

As also described in the above referred to patent the tie disclosed therein can be manufactured in long length for later use. The use of plastic material, generally polyvinyl chloride, makes the ties somewhat expensive as compared to the paper ties disclosed in Patent 3,068,135.

Where the tie is used in merchandising, say for tying bags, it is often desirable to print advertising matter, prices, etc. on the tie. This is difficult to do on plastic ribbons because printed matter does not adhere to it well. It requires special printing equipment and the printing must take place prior to the forming of the tie. This limits the interchangeability of the tie for various applications, requires the stocking of a selection of ties having different prints, and therefore increases its cost.

The paper tie, on the other hand, has a surface well suited for being imprinted. However, to be imprinted after the tie has been formed it must have a flat exterior surface. The tie disclosed in Patent 3,068,135 does not have such a surface. Printing is therefore generally done on one prior to the forming of the tie.

Paper ties are additionally vulnerable to moisture, which causes it to open up, and are not well suited for repeated use because stresses developed in the tie while it is twisted to an article tend to open it, the wire becomes detached from the paper. The many advantages afforded by the plastic tie have made it generally accepted on the market, particularly where it is likely to be subjected to moisture. There exists, however, at the present a need for a tie which combines the advantages of the plastic tie with low manufacturing costs as well as adaptability of the paper tie to receive printed matter.

Summary of the invention

Briefly, the present invention provides a tying strip in which an elongated plastic ribbon is bonded to a paper ribbon in a face-to-face relation. The plastic ribbon includes a longitudinal channel and a wire disposed therein between the ribbons of a diameter which is no more than the depth of the channel. A cementitious coating is applied to the wire and the paper ribbon for bonding them to the plastic ribbon.

Preferably, the plastic ribbon is a polyvinyl chloride ribbon and the cementitious coatings include a vinyl resin which, when subjected to heat, enter a bond with the plastic ribbon.

This tie substantially reduces the cost as compared to prior art plastic ties. The more expensive plastic ribbon is replaced by a low cost paper ribbon. By impregnating the paper ribbon with the thermoplastic adhesive its bond with the plastic ribbon is about as strong as if both ribbons were constructed of a thermoplastic material. Its manufacturing costs are therefore lower and in any event no more than those of all plastic ties.

The wire is embedded in the channel of the plastic ribbon, thereby assuring the paper ribbon to be flat. Its exterior surface can therefore be readily imprinted even after the tie has been formed. Thus, one tie can be used for a variety of applications by imprinting it just prior to its use. Inventories and costs can thereby be reduced. When applied to an article the tie has the attractive appearance of an all plastic tie since it can be applied to the article such that the plastic ribbon faces the exterior. It can be utilized in automatic tying apparatus presently dispensing plastic ties and it can be imprinted in such a tying machine.

Thus, while retaining most of the advantages of modern plastic ties and adding new ones thereto, the tie of this invention permits cost reductions in its manufacture.

Brief description of the drawings

FIG. 1 is a plan view of a tie constructed in accordance with the present invention;

FIG. 2 is an enlarged cross-sectional end view of the tie shown in FIG. 1;

FIG. 3 is a view similar to FIG. 2 showing a modified tie constructed in accordance with this invention; and

FIG. 4 is a fragmentary enlarged bottom view, with parts broken away, of the tie shown in FIG. 1.

Description of the preferred embodiments

Referring to FIGS. 1 and 2, a tie **10** constructed in accordance with the present invention includes first and second elongated ribbons **12** and **14**, respectively, and, disposed between the ribbons, an elongated wire **16**. The ribbons and the wire are bonded together as more fully described hereinafter. In use the tie is twisted around an article (not shown) to be tied such as a paper bag, for example.

The first ribbon **12** is constructed of a plastic material and includes an elongated, longitudinally extending channel **18** at about the center of the ribbon. The channel has a depth which is no less and preferably more than the diameter of the wire **16** for the reasons which are more fully set forth in the above referred to United States Patent 2,767,113. Briefly, if the channel has a depth which is greater than the diameter of the wire, the wire is fully embedded by the channel and permits a better bond both between it and the first ribbon **12** and also between the two

ribbons **12** and **14**. At the same time it enables the second ribbon to remain flat.

To assure a secure bond between the wire **16** and the first tie **12** the wire is given a cementitious coating **20** on its exterior which adheres to the plastic tie.

The second ribbon **14** is constructed of paper and a face **22** of it adjacent the plastic ribbon **12** is impregnated with cementitious coat **24**. The adhesive coat **24** on the paper ribbon bonds it to the plastic ribbon to form the tie **10**.

Referring to FIG. 3, a tie **26** is shown to include a pair of spaced-apart, substantially parallel wires **28** which are disposed between a plastic ribbon **30** and a paper ribbon **32**. The plastic ribbon defines a pair of channels **34** which have a configuration identical to that of channel **18** of the tie **10** shown in FIG. 2. The paper ribbon as well as the wires are provided with a cementitious coating for bonding them to the plastic ribbon **30** in the manner described above. This tie is particularly well adapted for tying larger articles or for tying a plurality of articles together since it is substantially stronger than the tie **10** shown in FIGS. 1 and 2. Its strength can, of course, be further increased by adding additional wires and correspondingly enlarging the width of the tie.

A presently preferred tie **10** and one with which best results have been obtained includes a plastic ribbon **12** constructed of a thin polyvinyl chloride sheet. The paper ribbon **14** is constructed of special long fiber extensible paper. It is coated with a thin layer of an adhesive including a vinyl resin which is dried on the paper face **22** and which enters into a bond with the plastic tie **12** when subjected to elevated temperatures.

This tie, ranging in width from about one-eighth inch to about one-half inch per each wire strand has embedded therein a twenty-six gauge wire **16**. The wire is also coated with a vinyl resin containing adhesive to bond it to the plastic ribbon.

All parts are brought together in axial alignment with each other, heated, and pressed together. The cementitious coatings thereby enter into a bond with adjacent portions of the plastic ribbon. Thereafter the tie is cooled to set and solidify the bond.

The tie is applied to an article (not shown) in any convenient manner, either manually or automatically with the help of now widely available tying apparatus. Referring to FIG. 4, the tie can be provided with printed matter **35** on a face **36** of the paper ribbon **14**. Preferably, the printing is applied to the tie after it has been formed to not limit the tie to one particular use. Printing subsequent to the forming of the tie is made possible by maintaining ribbon **14** and its face **35** flat and by constructing the ribbon of an imprintable material such as paper.

I claim:

1. Apparatus for tying articles comprising an elongated plastic ribbon defining a longitudinally extending channel, an elongated paper ribbon bonded to the plastic ribbon in face-to-face relation, the paper ribbon having a cementitious coating for bonding it to the plastic ribbon, a wire

disposed in the channel between the ribbons, the channel having a depth at least equal to the diameter of the wire, and a cementitious coating on the wire for bonding the wire to the plastic ribbon.

2. Apparatus according to claim **1** wherein the plastic ribbon is a polyvinyl chloride ribbon and the cementitious coating on the paper ribbon includes a vinyl resin.

3. Apparatus according to claim **1** wherein the paper ribbon is constructed of a long-fiber extensible paper.

4. Apparatus according to claim **1** including a plurality of spaced-apart, substantially parallel wires disposed between the ribbons.

5. Apparatus for tying articles comprising an elongated polyvinyl chloride ribbon defining a longitudinally extending channel, an elongated, flat paper ribbon having at least one of its faces impregnated with a cementitious coating including a vinyl resin, a wire having a cementitious coating on its exterior and disposed in the channel and bonded to the polyvinyl chloride ribbon, the channel having a depth which is at least as great as the diameter of the wire, said coated face of the paper ribbon being disposed adjacent the polyvinyl chloride ribbon and bonded thereto by the vinyl resin coating.

6. Apparatus according to claim **5** wherein the cementitious coating on the wire also includes a vinyl resin.

7. Apparatus according to claim **6** wherein the paper ribbon is constructed of long-fiber extensible paper.

8. Apparatus according to claim **7** wherein an exterior surface of the paper ribbon is flat and adapted to be imprinted.

9. Apparatus for tying articles comprising an elongated polyvinyl chloride ribbon defining a longitudinally extending channel, a wire having a cementitious coating on its exterior, the channel being sufficiently wide and deep to enable complete insertion of the wire therein such that the wire does not project past an open side of the channel, the wire being bonded to the polyvinyl ribbon, and a ribbon constructed of a long-fiber extensible paper having a side facing the polyvinyl ribbon coated with a cementitious coating including a vinyl resin, said side of the paper ribbon being bonded to the polyvinyl ribbon, an exterior side of the paper ribbon being flat and thereby capable of being imprinted.

10. Apparatus as defined in claim **9** wherein the wire is a twenty-six gauge wire.

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