This invention relates to a new method for packaging materials. In one of its aspects this invention relates to a new method of packaging cylindrical articles. In another aspect this invention relates to a new method of packaging rolls of baling twine.

Various twine-tying machines, such as haybaling machines, are usually provided with one or a pair of twine containers, each capable of holding a plurality of rolls of twine. Thus, some of these containers are formed to provide two compartments of a size to hold one roll of twine arranged in side-by-side relationship. In such containers, the twine of one roll is fed through an opening in the cover of the container and is connected at its end to the beginning of the twine in the other roll so that the twine may feed until both rolls are exhausted. Machines provided with containers of this type are usually provided with two of such containers so that the two lengths of the twine are fed to the baling mechanism. The twine containers of other machines have two side-by-side compartments deep enough to hold two superposed rolls of twine in each compartment so that the required two lengths of twine may be fed from a single container. In these deeper containers, each length of the twine is fed from the top roll in the compartment through an opening in the container cover above such compartment, the end of the top roll being connected to the beginning of the bottom roll in each compartment.

Still another type of container provided on haybaling machines is constructed for four rolls in side-by-side relation, the two lengths of twine being fed initially from the two inner rolls through spaced openings in the cover above such inner rolls. The ends of the inner rolls are connected to the beginnings of the outer rolls. As a result of these various types of containers requiring different arrangement of rolls, rolls of baling twine are packaged in a variety of ways. In some instances, rolls of baling twine are packaged separately in tightly wrapped paper covers. In such cases, it is necessary to unpackage each roll separately and manually tie the ends together to obtain a double length of baling twine. Many disadvantages arise from this method of packaging such as time consumed in handling, expense in packaging, twine rolls separate, and the presence of knots in the double length of twine that fouls twine mechanisms.

Some manufacturers package two rolls of baling twine in a single package by using a heavy cardboard container. This container allows the two rolls of baling twine to be connected into a single length; however, it poses other problems. The cardboard container offers very little support for the twine as it is unraveled, and often the twine collapses during unwinding. This method of packaging also is very susceptible to damage by moisture and offers little protection to the twine rolls during shipment. This method of packaging twine in cardboard containers also is very expensive. It is evident to those skilled in the art that an improved method of packaging twine rolls for various twine-tying machines would be a valuable contribution to the art.

This invention relates to a new method of packaging articles. It is another object of this invention to provide a practical method of packaging cylindrical articles together in a single inexpensive package. It is another object of this invention to provide an improved method of packaging multiple rolls of twine together in a single package that is inexpensive and easy to handle. It is still another object of this invention to provide a unique method of packaging rolls of baling twine that are connected together in a single length, together in a package of plastic material such that the twine may be dispensed directly from the package. It is yet another object to provide a unique package for cylindrical objects.

Various other aspects, objects, and advantages of this invention will be apparent to those skilled in the art on careful study of the specification, the drawings and the appended claims.

I have discovered a unique and novel method of packaging articles together in a single package by using tubular heat shrinkable materials. Basically my process involves inserting the articles to be packaged into a length of tubular heat shrinkable material that is slightly larger than the articles. After the articles have been inserted into the length of heat shrinkable tubular material, the ends of the material are secured by heat sealing or by folding them over the ends of the articles and the material is shrunk around the articles. The resulting package has a very smooth, durable, and attractive surface. By using a heat shrinkable plastic material the package is light weight, inexpensive, and very desirable for protecting the contents of the package. This process is desirable in packaging a variety of articles, particularly cylindrical articles that are often very difficult to package.

One preferred embodiment of my invention is illustrated in the drawings in which two rolls of baling twine attached together into a single length are packaged together. FIGURE 1 and FIGURE 2 are isometric views of two rolls of baling twine packaged together in an end-to-end relationship. FIGURE 3 is an isometric view of the packages shown in FIGURES 1 and 2; after the side has been opened for use. FIGURE 4 is an isometric view of two rolls of baling twine that have been packaged together in a side-by-side relationship. FIGURE 5 is an isometric view of the package shown in FIGURE 4 after it has been opened for use.

The package shown in FIGURE 1 is very easily made by inserting two rolls of baling twine into a length of heat shrinkable tubular material that is slightly larger in diameter than the rolls to be packaged. The length of the tubular material extends beyond the end of the two rolls of baling twine after they are inserted into it. The ends are then folded over each end of the baling twine and are tucked into the hollow inner core of the rolls of baling twine. After the ends of the section of heat shrinkable tubular material have been tucked into the hollow cores of the rolls of baling twine, the loosely packaged articles are placed into a suitable heat shrink tunnel where the tubular material is shrunk around the package into a smooth, tight covering. During the shrinking process the ends of the tubular material do not pull out of the hollow cores of the twine rolls. The entire surface of the tubular material shrinks uniformly into the smooth, tight protective surface.

The package shown in FIGURE 2 represents another embodiment of this invention wherein two rolls of binder...
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3. The rolls of twine are packaged in an end-to-end arrangement. The package shown in FIGURE 2 is made in much the same manner as that shown in FIGURE 1. The rolls of binder twine are compacted into a length of heat shrinkable material that is slightly larger in diameter than the rolls to be packaged. The ends of the tubular material extend past the ends of the twine rolls for a length of approximately 2 inches. Circular pieces of protective material such as heavy paper, plastic sheeting or the like that are smaller in diameter as the ends of the twine rolls are placed over each exposed end of the twine rolls. The twine rolls with the circular pieces of material on their ends and the tubular material fitted loosely around them are then placed in a suitable apparatus where heat is applied. The tubular material shrinks around the rolls of twine into a tight, smooth surface.

As the material shrinks, the ends are drawn down to contact the circular pieces of material placed over the ends of the twine rolls. The ends of the tubular material thus shrink to form a flat surface on the end of the twine rolls and firmly hold the circular pieces of protective material on the ends of the twine rolls.

FIGURE 3 shows an opened package of bale twine rolls that have been packaged in an end-to-end relationship. By making a traverse cut around the mid section of the packages shown in FIGURES 1 and 2 the package can be opened to expose the ends of the bale twine. As shown in FIGURE 3, the inner end of the twine of one roll is connected to the outer end of the twine of the other roll so that both rolls can be drawn from the package as one continuous piece. This feature eliminates the necessity of tying the two rolls of twine together and eliminates the presence of a knot in the length of the twine that fouls tying mechanisms. It also allows the twine to be dispensed directly from the package. By dispensing the twine directly from the package, the walls of the package support the twine and prevent it from collapsing while it is being unwound. Various modifications can be made in the packages shown in FIGURES 1 and 2 to allow easy opening to expose the two rolls as shown in FIGURE 3. For example, a pull tab mechanism can be attached to the opened packages such that they can be easily opened by pulling the tab and tearing the tubular material in a traverse path around the middle of the package. Dotted lines can be printed on the package to serve as a guide for cutting open the packages.

FIGURE 4 shows two rolls of binder twine packaged together in a side-by-side relationship. The package is easier to open by inserting the two rolls into a length of heat shrinkable tubular material that is slightly larger than the rolls of bale twine. The ends of the tubular material are loosely folded over and are sealed to the walls of the tubular material on each end of the package. This loosely sealed package is then placed in a suitable apparatus and heat is applied to the tubular material and it is shrunk around the two rolls of binder twine to form a smooth, durable surface.

FIGURE 5 shows an opened package of bale twine that has been packaged together in a side-by-side relationship as shown in FIGURE 4. It is easily seen that the inner end of the twine of one roll is connected to the outer end of the twine of the other roll to enable the twine to be dispensed in one continuous length. Only the top portion of the package is removed as shown in FIGURE 5. This easy removal may be made by cutting around the opening of the package or by use of a pull tab mechanism incorporated into the package before it is heat shrunk. The walls of the package help support the twine and prevent it from collapsing while it is being unwound.

By using this invention to package multiple rolls of bale twine, many advantages are realized. As shown in the drawings, rolls of bale twine can be packaged together such that the twine of the rolls can be drawn from the package in one continuous piece without having to tie the ends together into cumbersome knots. The tubular heat shrinkable material shrinks into a very smooth and durable finish. This attractive package is easy to handle and very light weight when compared with conventional packages. The plastic material shrunk around the rolls of the bale twine offers a great deal of support to the twine rolls as they are being unwound, thus preventing the twine from collapsing during the unwinding process. Since the packaging material is plastic it offers the added advantage of being waterproof and rot proof. This waterproof and rot proof protection practically eliminates storage problems associated with bale twine packaged by conventional methods. The simple packages disclosed by this invention offer a foolproof method of opening packages of binder twine that is not found in the rather complicated cardboard packages now in use. The tight plastic covering takes up little space in shipping and storage and offers great protection from shipping damage.

By preprinting the heat shrinkable tubular material, very attractive packages can be made that are not possible with conventional packaging methods. Because of its more compact shape, this package is more easily handled than conventional packages of twine and the like.

The heat shrinkable tubular material that can be used in this invention can be any heat shrinkable material that is known in the art. Some examples of suitable materials are polyethylene, polypropylene, polystyrene, polyvinylidene chloride, polyethylene terephthalate, and the like. Because of its wide commercial availability, polyethylene materials can be used to a great extent as packaging materials. It has been found that the tubular material must have a thick new of at least 0.005 inches to produce a durable package surface. The thickness of the material should not be greater than 0.015 inches for normal packaging. Material greater than 0.015 inches thick is not easily folded without the application of additional heat and will not easily shrink to the contour of objects. Preferably the material will be from 0.005 to 0.012 inches thick for producing smooth, durable, attractive packages. The amount of heat required in the heat shrinking process is determined by the type of material being used, the thickness of the material, the size and shape of the materials to be packaged, and the amount of tightness required in the finished package. The process of heat shrinking materials is known in the art. The tubular materials can be printed before they are applied to the objects to be packaged, thus eliminating the use of paper labels or the costly process of labeling the package after it is fabricated. The printing may be either on the front side or the reverse side of the tubular material.

Although the foregoing discussion has been devoted mainly to the packaging of bale twine, this process is not limited to the packaging of bale twine only. Many other articles can be packaged according to this invention. It is also within the scope of this invention to package objects that are not necessarily cylindrical in shape. For example, materials of square or rectangular shape can also be packaged according to this invention. It will be obvious to those skilled in the art that this process can be applied to the packaging of various articles wherein a light, durable, attractive protective packaging material is needed.

We claim:

1. A method of packaging two or more cylindrical rolls of twine to be dispensed from the package, said rolls being formed to be unwound from the inside and having the inner end of the twine of one roll connected to the outer end of the twine of the other roll so that the twine of both rolls can be drawn from said package as one continuous piece, the inner end of said other roll being free and projecting out the top of such roll, which comprises inserting said rolls of twine into a length of heat shrinkable tubular material having a thickness from 5 to 15 mils. The ends of said tubular material extending past the ends of said rolls of twine, holding said ends of said tubular material over in a manner that they contact the
walls of said tubular material, sealing said ends of said tubular materials to said walls and shrinking said material around said rolls of twine, said rolls being in abutting relationship.

2. The method of claim 1 where said rolls of twine are placed in said package in an end-to-end relationship.

3. The method of claim 1 where said rolls of twine are placed in said package in side-by-side relationship.

4. A method of packaging two or more cylindrical rolls of twine to be dispensed from the package, said rolls being formed to be unwound from the inside and having the inner end of the twine of one roll connected to the outer end of the twine of the other roll so that the twine of both rolls can be drawn from said package as one continuous piece, the inner end of said other roll being free and projecting out of the top of such roll which comprises inserting said rolls of twine into a section of heat shrinkable tubular material in an end-to-end abutting relationship, said material having a thickness of from 5 to 15 mils, the ends of said tubular material extending past the ends of said rolls of twine, folding said ends of said tubular material over said ends of said rolls of twine in such a manner as to insert the ends of said tubular material into the hollow core of said rolls of twine and shrinking said material around said rolls of twine.

5. A method of packaging two or more cylindrical rolls of twine to be dispensed from the package, said rolls being formed to be unwound from the inside and having the inner end of the twine of one roll connected to the outer end of the twine of the other roll so that the twine of both rolls can be drawn from said package as one continuous piece, the inner end of said other roll being free and projecting out of the top of such roll which comprises inserting said rolls of twine into a section of heat shrinkable tubular material in an end-to-end abutting relationship, said material having a thickness of from 5 to 15 mils, the ends of said tubular material extending past the ends of said rolls of twine for about two inches, placing a circular piece of protective material over the exposed end of each roll of twine, the diameter of said circular pieces of protective material being essentially the same as the diameter of said rolls of twine, and shrinking said material around said rolls of twine.

6. A package composed of two cylindrical rolls of twine to be dispensed from said package, said rolls being formed to be unwound from the inside and having the inner end of the twine in one roll connected to the outer end of the twine on the other roll so that the twine of both rolls can be drawn from the package as one continuous piece, the inner end of said other roll being free and projecting out of the top of such roll, said rolls being disposed in abutting relationship inside a length of heat shrinkable tubular material in an end-to-end relationship, said material having a thickness of from 5 to 15 mils, the ends of said tubular material being folded over the ends of said rolls of twine in such a manner that they contact the walls of said tubular material, said ends of said tubular material being sealed to said walls and said heat shrinkable tubular material being shrunk around said objects.

7. The package of claim 6 where said rolls are positioned in said package in a side-by-side relationship.

8. The package of claim 6 where said rolls are positioned in said package in an end-to-end relationship.

9. A package composed of two cylindrical rolls of twine to be dispensed from said package, said rolls being formed to be unwound from the inside and having the inner end of the twine in one roll connected to the outer end of the twine on the other roll so that the twine of both rolls can be drawn from the package as one continuous piece, the inner end of said other roll being free and projecting out of the top of such roll, said rolls being disposed in abutting relationship inside a length of heat shrinkable tubular material in an end-to-end relationship, said material having a thickness of from 5 to 15 mils, the ends of said tubular material being folded over the ends of said rolls of twine in such a manner as to insert the ends of said tubular material into the hollow core of said rolls and said heat shrinkable tubular material being shrunk around said rolls.

10. A package composed of two cylindrical rolls of twine to be dispensed from said package, said rolls being formed to be unwound from the inside and having the inner end of the twine in one roll connected to the outer end of the twine on the other roll so that the twine of both rolls can be drawn from the package as one continuous piece, the inner end of said other roll being free and projecting out of the top of such roll, said rolls being disposed in abutting relationship inside a length of heat shrinkable tubular material, in an end-to-end relationship, said material having a thickness of from 5 to 15 mils, the ends of said tubular material having extended about two inches past the ends of said rolls, a circular piece of protective material having a diameter essentially the same as the diameter of said rolls being placed over the ends of said rolls and said heat shrinkable tubular material being shrunk around said rolls.

11. The package of claim 10 where the heat shrinkable tubular material is polyethylene.

12. The package of claim 6 where the heat shrinkable tubular material is polyethylene.

13. The package of claim 9 where the heat shrinkable tubular material is polyethylene.

14. The package of claim 10 where the heat shrinkable tubular material is polyethylene and the protective material is a heavy paperlike material.

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