

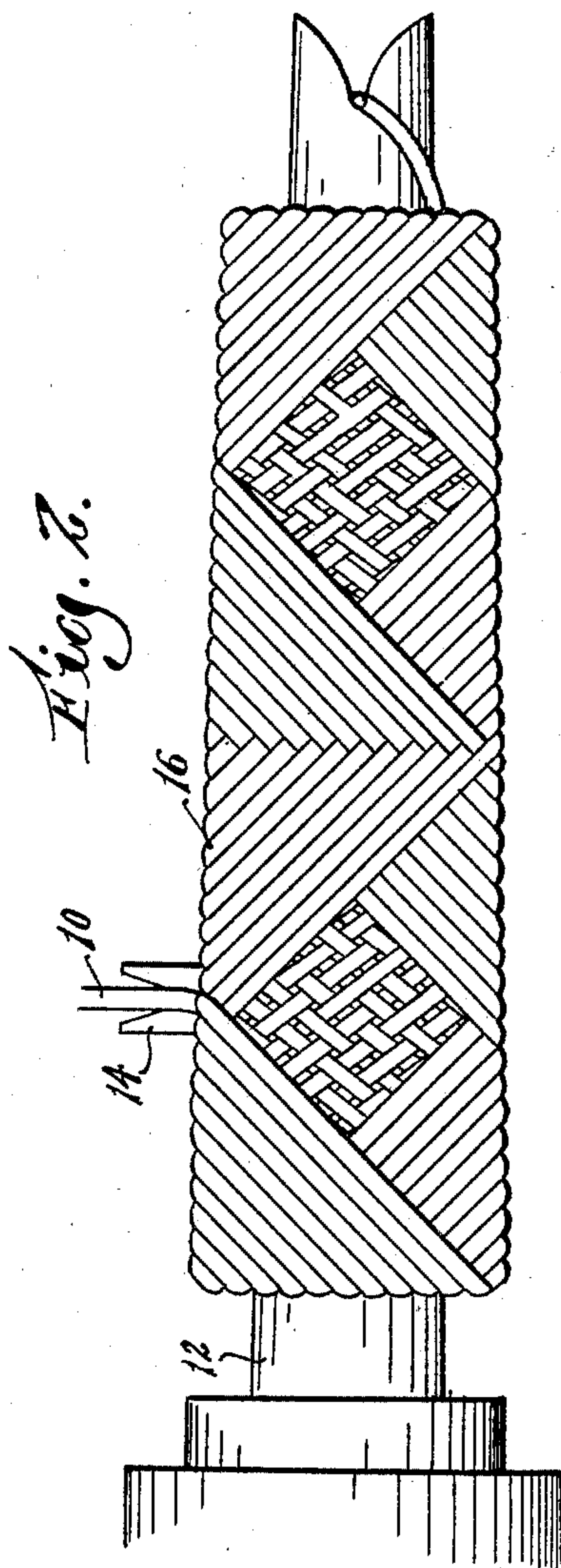
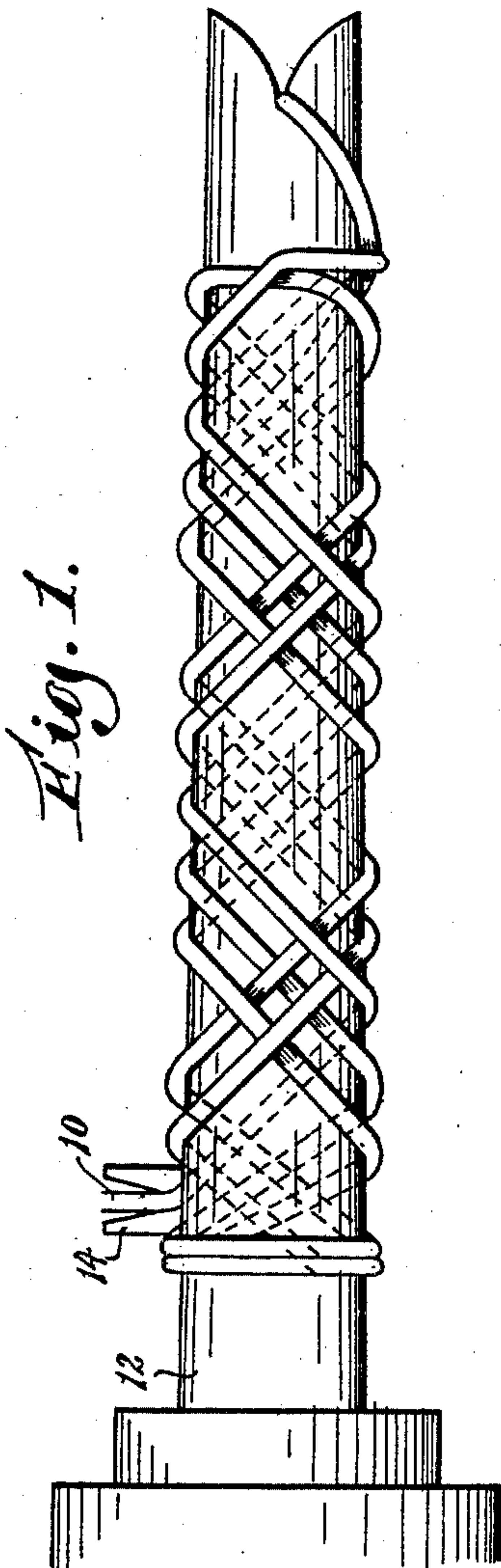
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TWINE PACKAGE AND PROCESS FOR ITS MANUFACTURE

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# UNITED STATES PATENT OFFICE.

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TWINE PACKAGE AND PROCESS FOR ITS MANUFACTURE.

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This invention relates to improvements in twine packages and processes for their manufacture. It is particularly useful for cops of binder twine. It provides for the making of such cops, of the compact or universal type of winding, without any core of foreign material, and without leaving a large hole in the centre, and yet without danger of collapse when dropped or otherwise mishandled. The invention provides a non-collapsing core made of the binder twine itself on a small hard spindle in the Universal style, without the twine slipping and bunching together at the centre as has hitherto occurred when such winding has been attempted; and provides so that when the twine is drawn for use it will come away freely from the centre of the cop, without the occasional holding hitherto noted owing to fibers being pinched together. In cops made with "Universal" or compact wind the above difficulties have been experienced, and the only ways known in the industry to avoid them have been to introduce a soft core of foreign material, as paper, or to make an extra large axial hole, which is wasteful, and then at extra expense to add a special reinforcing exterior covering to prevent collapse of the cop from shock. I have found that a part of the trouble arises from some of the convolutions first wound becoming slack by slipping on the core and the loops thus made becoming pinched between convolutions later wound. Also a part of the problem arises from the inherent hairy nature of binder twine, due to the spreading of fibre ends. Such fibre ends are pinched and held between threads later laid; and while this condition has not proved serious in the outer portions of the cop it, in combination with the pinching of loops, has been particularly annoying where at small circumference near the core.

It is among the objects of the invention to provide cops of binder twine which will be self-contained, strong and free from the above objections. An important feature is to make the cop in two portions, one of which is a core portion wherein the twine is laid with a short pitch such that it will not materially slip along the axis when laid directly on the small, hard spindle of the winding machine. When this winding has been made a few layers deep, enough to make a stable

centre, the pitch of the wind can be changed to standard, automatically, or by hand, and the remainder of the cop wound in the usual way. The labor and expense incident to the use of soft cores, and the resulting troubles in the harvesting machine, are eliminated, as well as the need for means to reinforce exteriorly a completed cop. A cop could be made with the short pitch used throughout the cop, but this would be objectionable because of the weak binding effect which a convolution of short pitch has at the cop end, where the direction of traverse is reversed. And if the long pitch, which makes the strongest binding for the cop ends, were used, the threads would slip and bunch badly at the core. The combination of a long pitch body with a short pitch core, and the combination in the core of a spacing apart of successively laid convolutions in the same layer, accomplishes the purposes desired in the best way.

It is intended that the patent shall cover by suitable expression in the appended claims, whatever features of patentable novelty exist in the invention disclosed.

In the accompanying drawings:

Figure 1 is an elevation showing the initial convolutions of a cop of binder twine being wound according to the invention on a small, hard spindle of a universal winding machine, and

Figure 2 is a like view showing a later stage of the winding, viz, a completely wound core and the first few convolutions over it of the winding which completes the cop.

In Figure 1 of the drawings a thread of binder twine is represented as being guided along the spindle of a winding machine by the usual twine guide. The twine is laid directly on the spindle with a pitch of wind so short that it does not materially slip axially thereon. A slight slipping of the initially laid winds may occur, but the slipping does not become objectionable unless it extends so far that bunching at the centre of the cop results. Such inconsequential slipping does not interfere with the winding of the cop body, nor cause deformation of the cop. Such a slipped condition is illustrated in Figure 1 in a conventional way, although it may not always occur; and there it may be seen that the slipping of end convolutions has gone but little inward from the



dotted limits 15 of traverse of the thread guide 14. The later convolutions do not slip at all. In the particular instance represented the cop will be of a standard size having dimensions of five and three-fourths to six inches from end to end, and a diameter of approximately seven inches. With a wind of the customary "Universal" type the twine may make two convolutions in travelling from end to end of such a cop. This long pitch of wind is entirely suitable for the body portion of a cop, but has a tendency to slip and to bunch at the centre of the cop producing a defect which it is an object of the invention to avoid.

According to the invention the twine at the beginning, as in Figure 1, is wound with a pitch considerably less than that which is to make up the body of the mass—enough less so that the twine will not materially slip, whatever that pitch may be. In the case illustrated I have found that a pitch producing anywhere from two and one half to four convolutions in the travel from end to end of the cop is suitable. However, the convolutions are not made close against each other as is usual and as is represented in the covering layer in Figure 2, but each thread is spaced from its parallel neighbor. This permits its projecting fibre ends to be pretty much clear of being pinched by threads laid subsequently; and prevents the latter from pinching any loose loop of a thread, if there be any such. After the convolutions are a few layers deep of this special wind, the pitch and feed of the winding may be shifted and the remainder of the cop may be made by the ordinary long pitch and compact lay, as seen at 16 in Figure 2. This is done by changing the gearing (not shown) between the rotation of the spindle 12 and the reciprocation of the thread guide 14.

The having of the spaced winding throughout the first layers of the cop is especially useful to permit the twine to come out easily and freely from the cop at all times. Completed cops made according to the invention will have greater inherent stability than cops as heretofore commonly constructed, having this both at ends and at center and requiring no core of paper, and no reinforcing exterior covering. And the central hole may be so small as to prevent the driver of a grain binder from carrying his supply of balls strung upon his rein guard, a practice which is pernicious because liable to disarrange the

ball's interior so as to cause other troubles in its unwinding.

I claim as my invention:

1. A twine cop composed of a core portion of wound twine and a body portion wound thereon; those convolutions which lie parallel and adjacent to each other and which are all in a single layer being laid apart, in said layer in the said core portion of the cop, and being laid compactly together in the said body portion.

2. A twine cop made with quick traverse lay and comprising a core of the twine where-in those convolutions which are parallel and adjacent to each other in a layer are spaced apart, and comprising a body portion of twine distinct from the core, continuous with and supported on said core.

3. A twine cop comprising a core made of the twine of the package, in which core the convolutions nearest together in each layer are spaced apart and are laid with shorter pitch than the pitch of the body of the cop, the said body being built on said core with the convolutions which are nearest together in each body layer laid compactly together.

4. A process for making twine packages comprising the winding of the initial layers of the twine with a quick traverse of short pitch and spaced convolutions, on a small, hard spindle, the said pitch being at least short enough for the frictional grip of twine on the hard surface of spindle to hold against material slipping thereon; followed by the winding of the body of the package with a quick traverse having longer pitch and having compact lay of adjacent convolutions.

5. A process for making twine packages comprising the forming of a core by winding the twine with convolutions all of short pitch throughout a small diameter at the centre of the package, and then abruptly changing the pitch of wind and thereby forming the body of the package on said core with convolutions all of longer pitch.

6. A process for making twine packages comprising the forming of a core by winding the twine with relatively short pitch and with convolutions spaced apart, said core occupying a small diameter at the centre of the package, and then forming the body of the package with long pitch and compact lay throughout.

Signed at Plymouth, Massachusetts, this seventh day of March, 1927.

JOHN H. DAMON.