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3,380,221

BALE PACKAGING

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FIG. 1

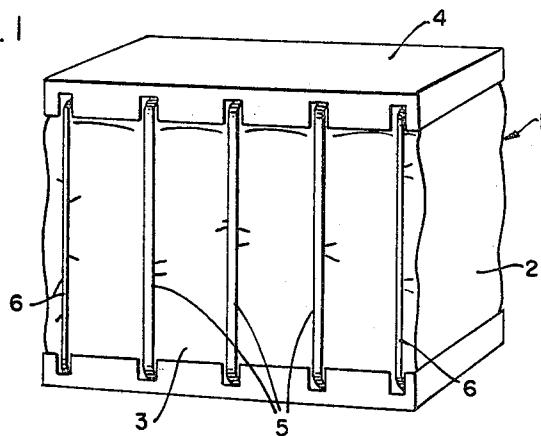


FIG. 2

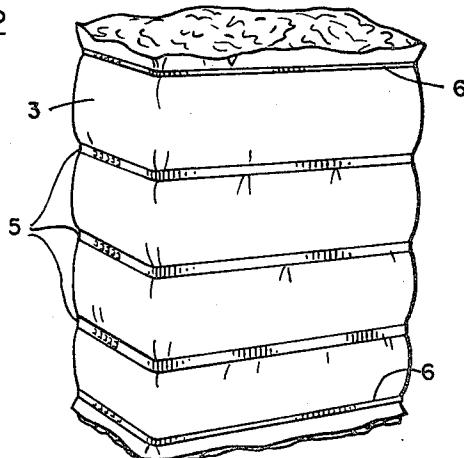
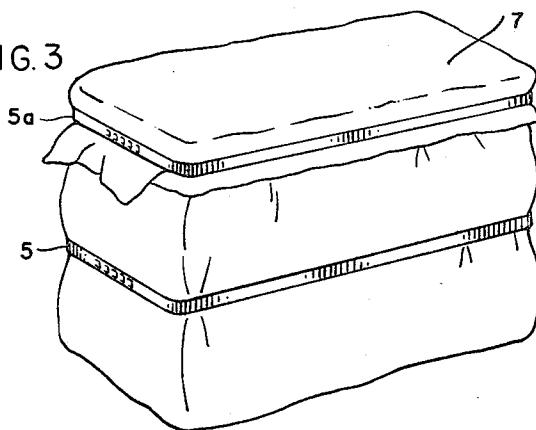


FIG. 3



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**BALE PACKAGING**

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S 95,664  
3 Claims. (Cl. 53—24)

This invention relates to the packaging of fibrous bales composed of cotton or similar textile fibers, and more particularly, the invention is concerned with the fastening of end caps onto the unwrapped end faces of a pre-compressed fibrous bale.

In the packaging of cotton or other textile fibrous bales under high compression, five or more cross-bands are generally placed transversely around the compressed bale which has been previously covered on its longitudinal sides with a suitable flexible covering or wrapper. These bands are locked in place by any suitable locking device or simply by overlapping the free ends of each band and making indentations or punches therethrough to give an endless band or ring around the lateral circumference of the bale. Then, after releasing the pressure of the bale press, the locked bands press inwardly against the outwardly expanding longitudinal surfaces of the fibrous bale, forming grooved-like depressions therein. Caps in the form of a pre-cut flexible wrapping material are then placed over the open or free end faces of the bale, and these caps are attached by means of adhesive strips or wide bands, straps, tapes or the like.

When fastening the end caps by the application of additional cross-bands, a serious difficulty arises in that the additional band surrounding the edges of the end cap tends to catch in the groove or depression formed nearby on the longitudinal surfaces of the bale by the previously applied cross-band which is adjacent the outer ends of the bale. This prevents one from adequately tightening the second cross-band around the edges of the end cap. Where the end caps are only imperfectly fastened, they can easily slip off or become pulled off, and the fibrous material at the end faces of the bale can become soiled or otherwise damaged. For this reason, it has further been suggested that longitudinal bands be placed around the bale as a means of preventing the unintentional removal of the end caps.

Also, an attempt has been made to stretch the second lateral fastening band for the end cap in a suitable manner such that the edges of the cap lying under the second band might become securely fastened in each case. However, since this operation cannot be carried out in the bale press, as in the case of the initially applied compression bands, a satisfactory result is not achieved even if the cross-band for the cap has as closely as possible the same tension as the remaining cross-bands previously applied to the bale.

One object of the present invention is to provide a process for packaging a compressed fibrous bale such that the end caps in the form of a flexible wrapping material can be securely fastened to the open ends of a previously longitudinally wrapped bale.

Another object of the invention is to provide a novel process for packaging the compressed fibrous bale in which it is possible to follow the conventional procedure of longitudinally wrapping and compressing the fibrous bale in a bale press and the end caps can then be fastened after removal of the bale from the press in a rapid and economical manner.

Yet another object is to provide a bale package which has been produced according to the process of the invention, whereby the fibrous bale is completely enclosed by a thin, flexible wrapping material.

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It has now been found, in accordance with the present invention, that one can obtain improved bale packaging by first applying in a conventional manner a plurality of first endless fastening bands in locked position around the lateral circumference of a compressed and longitudinally wrapped fibrous bale, such that these first bands hold the bale under compression and provided that the two outermost bands adjacent the outer open ends of the bale are readily detachable therefrom. In the next step of the invention, each open end face of the bale is covered with an end cap in the form of a flexible wrapping material with its edges extending inwardly along the longitudinal surfaces of the bale. A second endless band is then applied over the edges of each end cap around the lateral circumference of the bale to fit snugly thereon without compressing the bale. Finally, each of the outermost first endless fastening bands is then detached so as to release the bale from its compressed state under these initial bands, whereby the resulting expansion of the longitudinal surfaces of the bale adjacent its two ends will clamp the end cap edges between the second endless bands and the wrapped bale.

The steps in the process of the invention and the bale package resulting therefrom are further discussed in detail in the following specification taken together with the accompanying drawing wherein:

FIG. 1 is an illustration in perspective of a longitudinally wrapped fibrous bale between the stamping plates of a bale press, wherein the first compression bands have been applied to the fibrous bale;

FIG. 2 is an illustration in perspective of the fibrous bale after it has been removed from the bale press but prior to covering the faces thereof with caps; and

FIG. 3 is an illustration in perspective of the upper portion of the fibrous bale with a cap positioned thereon and fastened by a second endless band after having removed one of the previously applied bands.

Referring to the drawing, the fibrous bale 1 is exposed on its open end faces 2 and has its longitudinal surfaces 3 wrapped with a suitable flexible wrapping material. The longitudinally wrapped fibrous bale is compressed in a conventional manner by the upper and lower plates 4 of the bale press, and the bale is strapped with a plurality of at least four and preferably five or more cross-bands 5 and 6 which are locked in place by any conventional locking device so as to hold the bale under compression after it is removed from the bale press. This first series of longitudinally disposed end fastening bands are placed under a relatively high tension by the compressed bale and form grooves or indentations around the lateral circumference of the bale.

As shown in FIG. 1, the intermediate fastening bands 5 are conventional in their construction and are formed so as to provide a relatively permanent strapping around the bale. On the other hand, the two outermost fastening bands 6 near the open faces of the bale should be in the form of relatively thin or narrow detachable bands or wires, and they are preferably positioned such that they will not later be covered by the edges of the end caps. For example, these detachable bands or wires 6 can be made so as to be easily cut or severed for removal. Also, it is possible to use bands 6 which are fastened in the form of a ring or strap around the bale by suitably detachable clasps, thereby making it possible to use the same band any number of times in the packaging process.

In carrying out the process of the invention, it is preferable to apply the bands 6, which are to be later removed, so that they possess a lateral circumference which is somewhat shorter than the remaining cross-bands and so that the bale is placed under somewhat greater tension adjacent its open ends. Then, in spite of the loss of tension resulting from the removal of these bands 6, a second

set of bands 5a as well as the remaining cross-bands 5 will have about the same tension in all cases. On the other hand, if the outermost detachable bands 6 have about the same length as the intermediate cross bands 5 and all of the bands are contracted together in the bale press with the same tension, then the tension of the subsequently applied cross-bands 5a, which are applied according to the invention outside of the pressed material and around the bale over the edges of the caps, will be less than the intermediate cross-bands 5.

As shown in FIGS. 2 and 3, the compressed bale is first removed from the bale press with the outermost detachable bands 6 positioned a short distance from the open end faces of the bale. The end cap 7 composed of a suitable thin, flexible, wrapping material is then placed over the end face of the bale with the edges of the material smoothed down to extend inwardly along the longitudinal surfaces of the bale. The second cross-band 5a is then applied around the edges of the cap 7 so as to fit firmly or snugly on the bale, preferably in a position around the lateral circumference of the bale which is alongside of the detachable band 6 but toward the end of the bale. The bands 6 are then cut or otherwise detached so as to partly release the circumferential surface of the bale thereunder from compression and expanding the bale to clamp the cap 7 tightly in place.

The novel and essential feature of the process according to the invention resides in the fact that one must use as a fastening means for the outermost portions of the compressed bale two narrow flat bands or thin wires which can be easily cut or detached and which can thus be exchanged for normal cross-bands which tightly enclose and hold the edges of the caps. Thus, the two outer, temporary cross-bands 6 serve as a bale strapping only until the outer ends of the fibrous bale are covered with caps and cross-bands of normal width and strength have been applied down over the end of the bale and around the edges of the caps up to the first ridge formed by the outer grooves. Once the normal cross-bands 5a are located in their correct position, i.e. almost over the grooves formed by the temporary bands 6 but without completely covering these temporary bands, it is then possible to easily detach the temporary bands by unlocking them or cutting through them with a metal cutter or the like. The fibrous material then expands after being released from the high pressure applied by the temporary bands 6, and this expansion of the fibrous bale very tightly fastens the edges of the cap 7 between the bale and the secondary bands 5a while also fixing the secondary bands firmly in place.

It will be apparent that the size and strength of each of the individual bands or wires will depend to a large extent upon the particular fibrous material being packaged and the forces of compression which are apt to be involved. For this reason, one cannot specify the exact size, shape, strength, etc. of the individual bands other than to point out that they must all possess sufficient strength to initially hold the bale under compression, including the detachable bands 6. Otherwise, these bands

can be made of any suitable material previously known for this purpose, e.g. metal bands or wires or even straps of a synthetic material such as a nylon cord or strap. Of course, if the outermost detachable bands 6 are constructed so that they may be wrapped around the bale and their free ends fastened with a suitable removable clasp or lock, then all of the bands can have the same dimensions and strength. These and other minor variations of the invention will be apparent to those skilled in the art and should be included within the spirit and scope of the invention.

When following the procedure of this invention, the end caps and the wrapping material covering the longitudinal surfaces of the bale thereunder are bound quite tightly to each other under the very high tension of the secondary endless bands. Also, this result is achieved without any necessity of applying the end caps in the bale press and without applying extreme tension to the secondary bands as they are placed over the edges of the end caps. After the bale package is completed, the end caps cannot become separated therefrom except by cutting the relatively permanent secondary bands which hold the caps in place.

The invention is hereby claimed as follows:

1. A process for packaging a compressed fibrous bale which comprises: applying a plurality of first endless fastening bands in locked position around the lateral circumference of a compressed and longitudinally wrapped fibrous bale, said bands holding said bale under compression and the two outermost bands adjacent the outer open ends of the bale being detachable therefrom; covering each open end face of said bale with an end cap in the form of a flexible wrapping material with its edges extending inwardly along the longitudinal surfaces of the bale; applying a second endless band over the edges of each end cap around the lateral circumference of the bale to fit snugly thereon without compressing the bale; and detaching each of said outermost first endless fastening bands whereby the resulting expansion of the longitudinal surfaces of the bale adjacent its two ends clamps said end cap edges between said second endless band and the wrapped bale.

2. A process as claimed in claim 1 wherein said detachable endless bands have a smaller circumference than the remaining bands.

3. A process as claimed in claim 1 wherein said second endless band is applied around the lateral circumference of the bale alongside of said detachable band toward the end of the bale.

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