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Willard et al.

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[54] **APPARATUS FOR ASSEMBLING A BATTEN MOUNTED PACKAGE**

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[52] **U.S. Cl.** ..... **100/7**, 53/198 R, 100/3, 100/26, 100/215

[51] **Int. Cl.** **B65b 13/06**

[58] **Field of Search** ..... 100/3, 2, 7, 25, 100/26, 215; 53/124 D, 198

[56] **References Cited**

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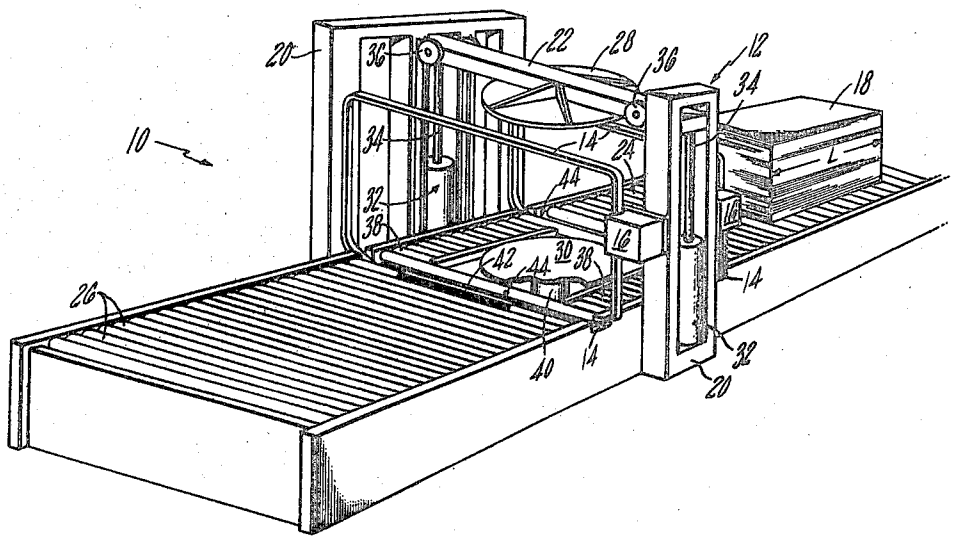
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Attorney—John M. Prutzman et al.

[57] ABSTRACT

Apparatus for use with a package compression strapping machine including a batten receiving passageway below a lower pressure platen in adjacent spaced relation thereto and a batten lift mechanism in the passageway for raising a batten from a recessed position in the passageway below the lower pressure platen into engagement with a bottom surface of a compressed package and for holding the batten in a controlled position thereon for subsequent engagement and tensioning of strapping about the batten and compressed package.

6 Claims, 3 Drawing Figures



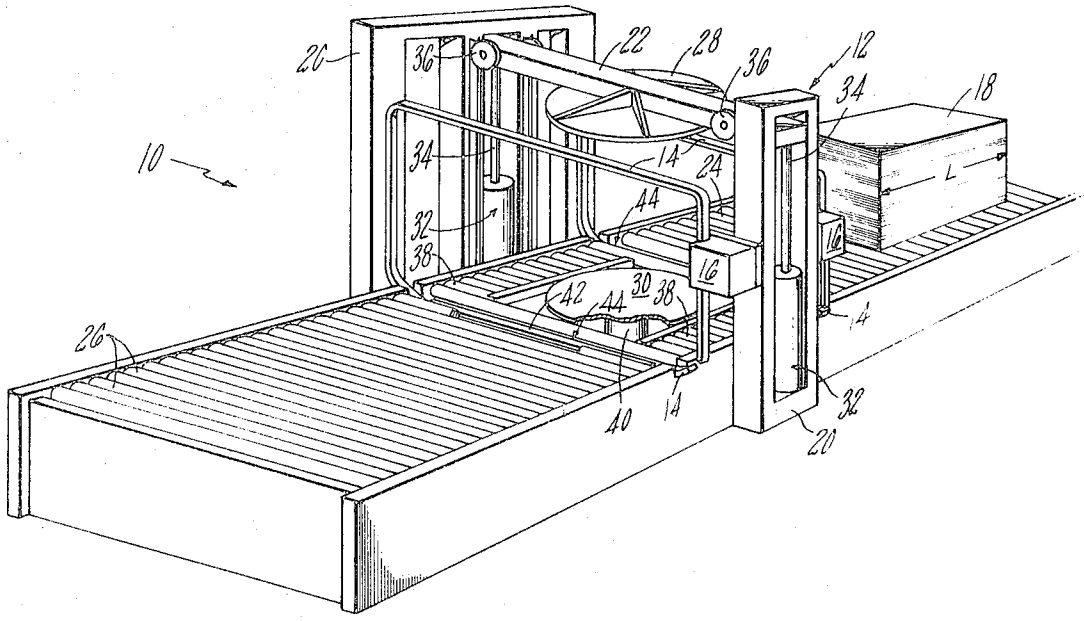


FIG. 1

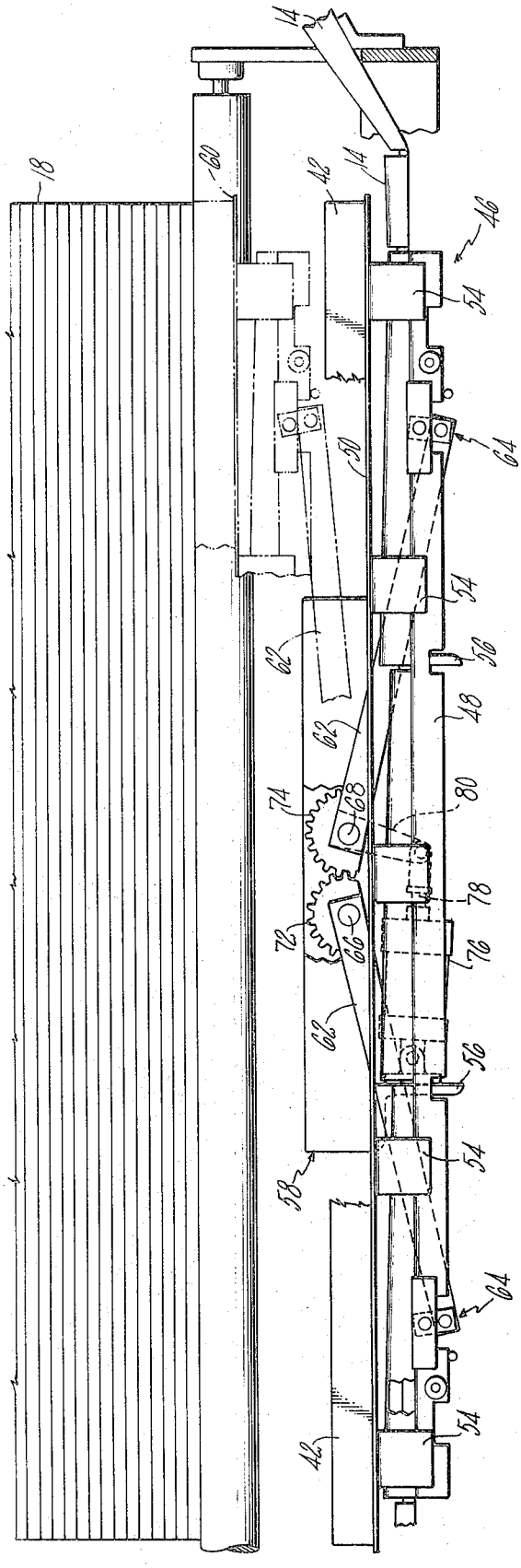


FIG. 2

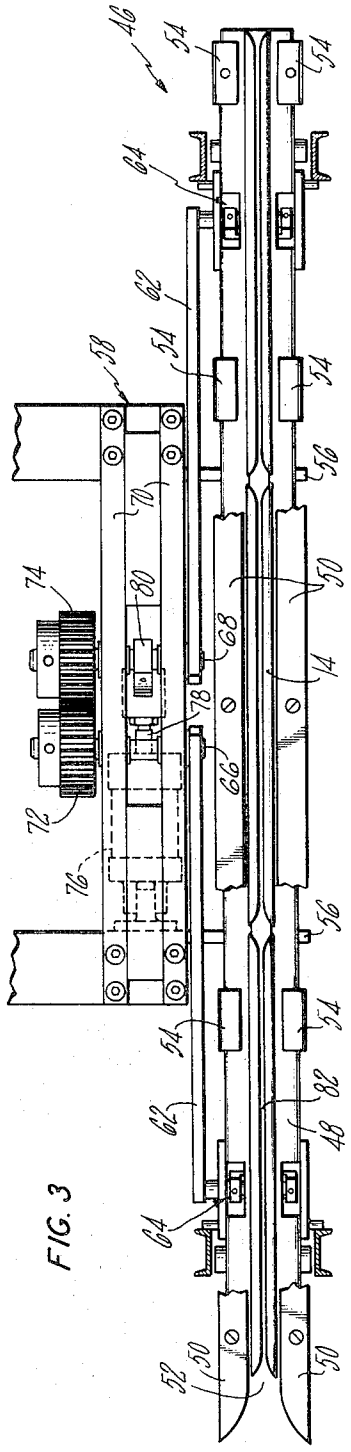


FIG. 3

APPARATUS FOR ASSEMBLING A BATTEN MOUNTED PACKAGE

FIELD OF THE INVENTION

This invention generally relates to the article handling art and particularly concerns apparatus for compressing a skidless conveyed package and strapping a batten to the compressed package.

BACKGROUND OF THE INVENTION

To facilitate handling and shipment of packages, a conveyor is conventionally employed to deliver packages, such as stacked sheet material as an example, to a compression strapping station wherein suitable apparatus exerts pressure to the sheet material and strapping is applied while the sheet material is compressed. Demand has increased for skids on such packages to permit the use of fork lift trucks and to otherwise facilitate handling for strapped packages. However, compression of a stack of sheet material directly onto a package support such as the deck board of a conventional wooden skid may undesirably indent lower sheets of a stack during compression and strapping and may even damage the skid. Successful efforts have been made to compress skid-mounted conveyed packages such that the skid is not indented or otherwise damage during package compression as exemplified by the construction disclosed in United States Pat. No. 3,182,586 issued May 11, 1965, to D. T. Armington, et al. and entitled "Press Apparatus for Package Compressing and Strapping." In certain applications, it may be desired to eliminate handling and disposal of wooden skids having conventional package supporting deck board and to simply replace such skids with a pair of bottom runners or battens. But, conventional apparatus for assembling bundles of compressed sheet material and the like with a pair of bottom runners have shown tendencies for marked localized compression of those sheets resting on the battens and have also created troublesome problems in controlling placement of such battens in relation to the package during the stripping operation.

OBJECTS OF THE INVENTION

Accordingly, a primary object of this invention is to provide an apparatus particularly useful with a compression strapping machine and which accurately positions battens directly in engagement with a bottom surface of a compressed package and provides positive control of such battens prior to securing them in position on the package during a subsequent strapping operation.

Another object of this invention is to provide a simplified but rugged apparatus of the type described for use with either existing or new compression strapping machines to effect quick and easy strapping of battens to a compressed package for providing a single palletized unit.

A further object of this invention is to provide apparatus of the above described type which effectively minimizes localized package compression and damage to the package supporting battens.

Still another object of this invention is to provide an apparatus of the above described type which is particularly suited to accommodate battens of different sizes.

Other objects will be in part obvious and in part pointed out in more detail hereinafter.

SUMMARY OF THE INVENTION

The above and related objects are achieved in accordance with this invention by the provision of a batten receiving passageway disposed below an upper surface of a rotatable lower pressure platen of a compression strapping machine located along a generally horizontally extending path of a package conveyor. The batten receiving passageway is provided in laterally spaced relation to the platen, preferably in transverse relation to the path of package movement on the conveyor. A batten lift mechanism is operatively mounted in the batten receiving passageway for raising a batten from the passageway in a controlled manner into direct engagement with a bottom surface of a compressed package but before strapping is tensioned about both the batten and the compressed package during a subsequent strapping operation.

A better understanding of the objects, advantages, features, properties, and relationships of the invention will be obtained from the following detailed description and accompanying drawings which set forth an illustrative embodiment and is indicative of the way in which the principle of this invention is employed.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a schematic overall perspective view of a compression strapping machine incorporating this invention;

FIG. 2 is an enlarged side view, partly broken away, illustrating certain features of this invention in detail, together with a strapping chute; and

FIG. 3 is an enlarged top view, partly in section and partly broken away, of the apparatus of FIG. 2.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings in detail, a compression strapping machine 10 is shown in FIG. 1 as including a superstructure support frame 12 shown supporting a pair of strap-receiving chutes 14, 14 and a power strapping head 16 for feeding strapping through each chute 14 and around a package such as at 18 when it is positioned within the strapping station. The specific arrangement of the strapping feeding and chute system components is not by itself a part of this invention. To obtain an understanding of a suitable arrangement for feeding strapping which may be employed in connection with this invention, it will be sufficient to refer to United States Pat. No. 3,585,780 issued June 22, 1971, in the name of James Elmore, entitled "Strapping Machine Including Feeder for Edge Protectors," and which discloses pertinent subject matter which is incorporated herein by reference. The superstructure support frame 12 includes a pair of upright pillars 20, 20 and a connecting cross beam 22 extending over a conveyor 24 shown with a plurality of horizontally disposed powered rollers 26 which may be driven by any suitable means such as a powered chain drive, not shown.

An upper pressure platen 28 is attached to the connecting cross beam 22 in overlying relation to a lower pressure platen 30 which is preferably circular and of a diameter less than that of the longitudinal dimension "L" of package 18 such as the illustrated stack of sheet material shown in a position on the conveyor 24 to be

delivered into position between the upper and lower pressure platens 28 and 30.

For powering vertical reciprocation of the connecting cross beam 22 and upper pressure platen 28, a pair of hydraulic operators 32, 32 are mounted on opposite sides of the conveyor 24 and supported by the frame 12. The hydraulic operators 32, 32 may be double acting and operatively connecting to the cross beam 22 by connecting rods 34, 34 for moving the cross beam 22 vertically upward and downward along the upright pillars 20, 20 with cross beam guide wheels such as at 36 engaging the pillars 20, 20 and stabilizing the cross beam 22 during its reciprocable movement between its upper rest position shown in FIG. 1 and lower compression position which will be understood to be below its illustrated position in FIG. 1.

Lower pressure platen 30 is preferably a rotatable center supported platen which in the specific illustrated embodiment is shown positioned between a pair of spaced apart, horizontally extending, substantially parallel conveyor rows 38, 38 disposed at the strapping station underneath the cross beam 22. While the lower pressure platen 30 may be lifted and rotated by an suitable apparatus, it is particularly suited to be mounted for reciprocal axial movement between its illustrated normal rest position (seen in full lines in FIG. 1) and extended position (not shown, but which will be understood to be in raised relation to its illustrated normal position) by a lift assembly 40 fully described in copending United States patent application, Ser. No. 204,455 filed in the name of Robert L. Haven on Dec. 3, 1971, and entitled "Conveyor System Lift Assembly," the subject matter of which application is incorporated herein by reference.

Briefly, the lift assembly 40 as fully described in the above referenced patent application includes suitable drive means for reciprocating the lower pressure platen 30 between its rest and extended positions during which time the lower platen 30 moves through an intermediate elevated position. The drive means of the lift assembly includes an angular control operator which maintains the lower platen 30 in a nonrotating condition for a straight lift between its normal rest and intermediate elevated positions and then rotates the lower platen 30 a predetermined angular amount during reciprocation of the platen 30 between its intermediate elevated and extended positions for reorienting a package such as 18 when it is supported on the platen 30 relative to the conveyor 24. The straight line lift of the lower platen 30 effected by the lift assembly 40 accordingly ensures clearance of the rollers 26 of the conveyor 24, and the subsequent reciprocal movement of the platen 30 between the intermediate elevated and extended positions of the lift assembly 40 provides a desired rotation such as a right angle displacement to reorient the package 18. Thereafter, the lower pressure platen 30 simply drops through a linear path of movement from the intermediate elevated position to its illustrated rest position to return the reoriented package 18 to the conveyor level for subsequent discharge.

In accordance with this invention, a unitized batten mounted package is assembled by conveying the package along the conveyor 24 to the compression strapping station and feeding strapping through the strap-receiving chutes 14, 14 to surround the package in outwardly spaced looped relation about the package which may then be compressed, preferably by the power hydraulic operators 32, 32 to lower the upper pressure platen 28 to compress the package supported by the lower pressure platen 30. With the package under compressive force, suitable runners or battens such as at 42 are then raised into direct engagement with the bottom surface of the compressed package. The battens may be beams, e.g., of wood of any suitable cross sectional size for a desired application, and are preferably of sufficient length to extend across the full width of the package in coextensive engagement therewith and in position for a subsequent strapping operation. During the strapping operation, the strapping is tensioned so as to be brought into engagement with the battens 42 and the package 18 as the power strapping heads 16 quickly and efficiently tighten and seal the strapping to provide a single batten mounted unit. The lift assembly 40 may then be operated as described above such than the compressed and strapped package 18 is lifted a sufficient distance upwardly, to ensure the battens 42 clear the conveyor 24, and is then rotated to reorient the batten mounted unit with its battens 42 repositioned to extend longitudinally along the path of package movement on the conveyor 24 for discharge upon subsequent return of the lower pressure platen 30 into its illustrated normal rest position.

More specifically, a pair of exposed batten receiving passageways 44, 44 are shown in the preferred embodiment of FIG. 1 extending transversely in recessed relation entirely across the full width of the conveyor 24 along the path of package movement with each batten receiving passageway 44 adjacent platen 30 and spaced laterally outwardly of the lower pressure platen 30 and underneath its upper surface in its normal rest postion. A strapping chute as at 14 and power strapping head such as at 16 may be provided for each of the batten passageways 44, 44 and a suitable batten feeding station of a type shown in the reference U.S. Pat. No. 3,585,780 may also be provided for each of the batten passageways 44, 44. The depth and width of each batten receiving passageway is designed to be suffient to accommodate battens of varying thickness and width.

The batten receiving passageways, 44, 44 will be understood to be of generally similar construction and are provided with a batten lift mechanism of generally identical construction. Accordingly, it will be sufficient for an understanding of this invention to describe only one such batten lift mechanism as more specifically shown at 46 in FIGS. 2 and 3.

Each batten lift mechanism 46 includes an elongated frame 48 extending longitudinally of its batten receiving passageway 44, and a portion of its associated strapping receiving chute 14 is shown mounted on the elongated frame 48 in underlying relation to a pair of elongated batten support plates 50, 50 which are in parallel spaced relation within the passageway 44 to define an elongated strapping passage 52 between the plates 50, 50. While the support plates 50, 50 may be secured to the underlying frame 48 by any suitable means, in the preferred embodiment a plurality of spaced apart brackets of generally inverted "L" shape are shown at 54 for mounting the support plates 50, 50 in fixed relation to the frame 48.

The battens 42 may be of widely varying cross-sectional dimensions, and to desirably minimize any tendency of the battens 42 to become skewed relative to the strapping during the strapping operation in accordance with this invention, the batten support plates

50, 50 are reciprocably mounted within their passageway 44 for raising a batten disposed in the passageway in a continuously controlled manner into direct engagement with a bottom surface of the compressed package before engagement and tensioning of the strapping about the batten and package.

While different means may be used for lifting the batten support plates 50, 50 from a normal rest position (shown in full lines in FIG. 2 wherein underlying extensions 56, 56 of a base support member 58 are shown establishing fixed stops for the frame 48) into an upper extended position (depicted by broken lines at 60 in FIG. 2), a pair of lift arms 62 are shown in the preferred embodiment drivingly connected to opposite end portions of the frame 48 through suitable pivot linkage such as at 64 mounted on remote swinging ends of the lift arms 62, 62. Adjacent ends of the lift arms 62, 62 are respectively fixed to parallel drive shafts 66 and 68 which are mounted for rotation on connecting cross beams 70, 70 of the base support member 58, and each of the drive shafts 66 and 68 are secured for rotation respectively with meshing gear segments 72 and 74.

To reciprocate the batten support plates 50, 50 between their normal rest position and upper extended position, a double-acting power cylinder 76 is shown mounted on the base support member 58 with a piston rod 78 drivingly connected through a link 80 to drive shaft 68 for rotating it in opposite angular directions upon operation of the power cylinder 76, whereby the remote swinging ends of both lift arms 62, 62 are simultaneously raised and lowered in unison with one another through the driving connection provided by the meshing gear segments 72, 74 to provide a controlled lifting of a batten 42 into position on the bottom surface of the compressed package 18 and subsequent return of the lift arms 62, 62 into normal rest position.

In the preferred embodiment, the underlying strapping chute 14 will be seen to be simultaneously raised upon lifting of the batten support plates 50, 50 into their upper extended position at 60 whereupon subsequent operation of the power strapping head 16 associated with the passageway 44 tensions the strapping to cause its withdrawal from an elongated channel 82 of the strapping chute 14 and through the strapping passage 52 between the batten support plates 50, 50 and to be tightened into engagement with the batten 42 which is positively held against the package 18 by the batten lift mechanism 46. With the batten 42 maintained in position in such controlled fashion, the strapping may be positvely tightened into engagement with the batten 42 and sealed about the package 18 in longitudinally extending aligned relation to the batten 42.

By virtue of the above described structure, the compression strapping machine provides for compressing the package and effecting a distributed compressive loading prior to any batten being positioned on the package, thereby minimizing any localized package compression and damage to the batten. Tensioning and sealing of the strapping subsequent to the placement of battens on the package results in a compact batten mounted package particularly easy to handle in a quick and efficient manner without any necessity to dispose of any costly wooden skids.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

We claim:

1. In combination with a package strapping apparatus, a conveyor for moving a package along a generally horizontally extending path, compression means for engaging and compressing a package including a rotatable platen mounted for reciprocable movement between a normal position aligned with the conveyor and a relatively elevated position, a batten receiving passageway disposed below an upper surface of the platen in its normal position and in transverse relation to the path of package movement on the conveyor, the batten receiving passageway being in laterally spaced relation to the platen, means for raising a batten disposed in the batten passageway into direct engagement with a bottom surface of a compressed package before tensioning of strapping during a strapping operation, and a rotary lift mechanism for raising the platen a sufficient distance for the batten secured thereto by strapping to clear the batten passageway and the conveyor and for rotating the compressed and strapped package for discharge along its path of movement on the conveyor.

2. The combination of claim 1 wherein the platen of the compression means is a rotatable center supported bottom pressure platen for providing centralized package support, and wherein the compression means further includes an upper pressure platen support structure positioned adjacent the conveyor and extending over the top thereof, and an upper pressure platen mounted on the support structure above the bottom pressure platen, and means for moving the upper pressure platen for compressing the package and effecting a distributed compressive loading thereon prior to applying the battens to the compressed package.

3. The combination of claim 1 wherein the strapping apparatus includes a strapping receiving chute disposed at least in part in the batten passageway, and wherein said batten raising means includes a batten support mounted for vertical reciprocable movement in the batten passageway, the batten support being in aligned overlying relation to its respective strapping receiving chute for subsequent application of strapping about a compressed package in longitudinally extending, aligned relation to the batten after it is raised into engagement with the package.

4. The combination of claim 3 wherein the batten support for the batten passageway includes a pair of elongated parallel support plates disposed in spaced apart longitudinally extending relation within the batten passageway to define an elongated strapping passage between the support plates in overlying relation to the strapping receiving chute.

5. The combination of claim 3 wherein said batten raising means further includes power operated means drivingly connected to the batten support for moving it upwardly in a controlled manner toward the compressed package for positioning each batten in coextensive engagement with the compressed package for a subsequent strapping operation.

6. The combination of claim 3 wherein the strapping receiving chute disposed in the batten passageway is secured to the batten support in underlying relation thereto for movement in unison therewith toward and away from a compressed package.

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