Dec. 1, 1959 J. C. BENSCHOTER 2,915,208

BALING METHOD AND BALE

Filed June 8, 1953

Fig. 1.

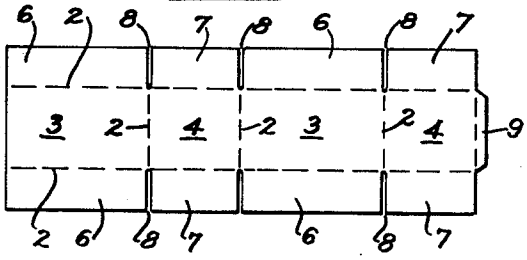


Fig. 2.

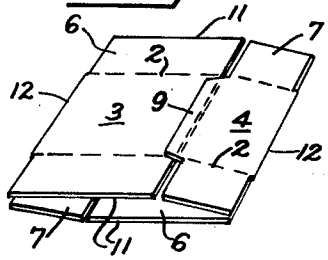


Fig. 3.

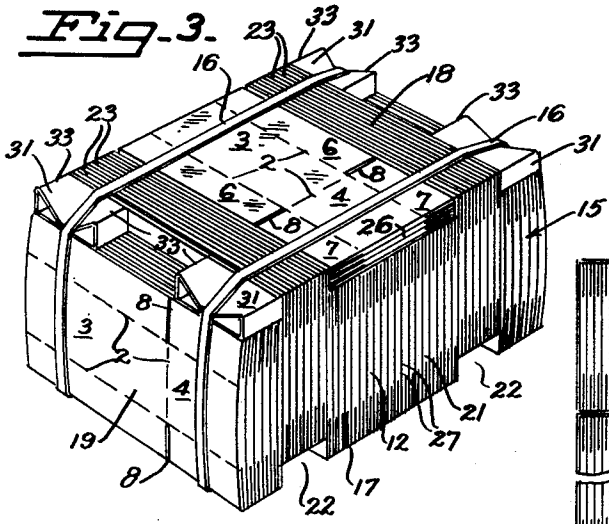


Fig. 4.

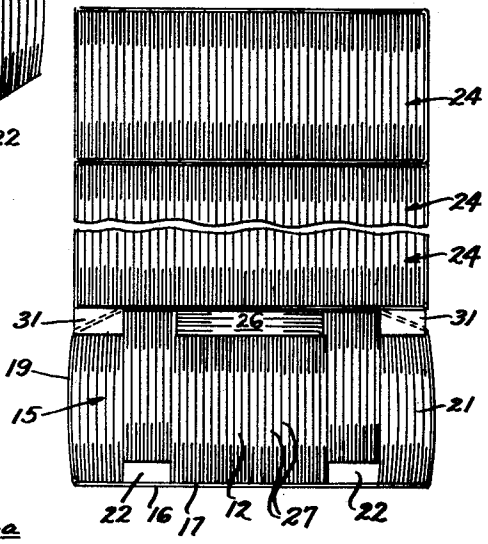


Fig. 7.

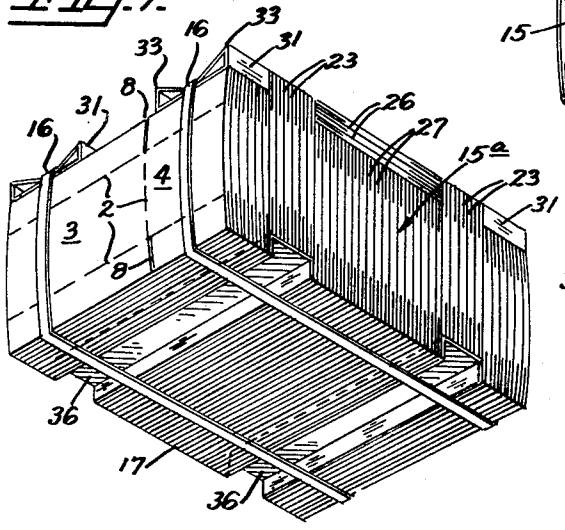


Fig. 6

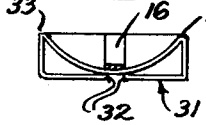
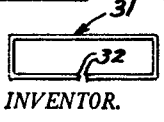


Fig. 5.



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BALING METHOD AND BALE

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6 Claims. (Cl. 214—152)

This invention relates to new and useful improvements in baling of sheet material. More particularly, the invention relates to a bale of paperboard knockdown carton blanks so formed as to facilitate transportation of the bale by a conventional fork lift truck. Reference is made to assignee's co-pending patent application by Bernard F. Altick, Serial No. 283,738, filed April 22, 1953, for "Method of Handling Sheet Material and Bale Therefor," now abandoned.

The problem to which the present invention is directed is the convenient storage and transportation of knockdown carton blanks and other sheet material. Such material is customarily fabricated in a factory and assembled in small bundles of approximately 25 sheets tied together by cord or wire; the bundles are stacked flatwise in piles on pallets; the piles are transported by carrier to the location where the cartons are to be filled; upon reaching the location, the piles are stored until required; finally the piles are transported to the station at which the cartons are to be filled or the sheets otherwise used. Thus, the sheets, prior to being used, are subjected to a number of handling and transporting operations which involve time and labor. Numerous pallets are employed resulting in additional costs.

A method of eliminating much of the labor and time of prior methods of handling sheets has been disclosed in said patent application, Serial No. 283,738. In that application an invention is set forth whereby a bale of sheet material is formed with sheets positioned in overlying relationship, and with the like edges of the sheets forming or defining a pair of opposite sides of the bale. The bale is held together by conventional securing means passing around the opposite sides. The bottom of the bale is formed by the edges of the sheet, thereby employing the edge side as the side for support of the bale on a supporting surface, which may be another similar bale whose edge side is in engagement with the edge side of the bale stacked thereon, or any other supporting surface such as the floor.

This arrangement of the sheets or knockdown cartons in the bale enables insertion under the bottom of any bale of a relatively sharp-edged lift element such as the fork members of a lift truck. Material damage to the sheets in the bale is avoided.

The present invention comprises an improvement over said prior invention in that certain of the sheets in the bale are elevated relative to the adjacent sheets so that the underside of the bale is formed with one or more recesses or channels, each of which is of a width and depth sufficient to receive one of the fork elements of the lift truck. Preferably, a pair of channels is formed in the underside of the bale, the channels being spaced apart the distance between the fork elements or tines of a conventional fork lift truck. Thus, when it is desired to transport a bale formed in accordance with this invention, the operator maneuvers a lift truck so that the fork elements fit into the channels formed in the underside of the bale, whereupon the bale, together with any desired

number of superimposed bales, can be elevated and transported.

A further feature of the invention is the formation of the bale so that whereas the bottom of the bale is provided with recesses or channels of the character described, the top of the bale is substantially flat, thereby affording a suitable flat supporting surface on which additional bales may be stacked, thus precluding the elevated sheets which form the described recesses or channels from becoming pushed downwardly by a heavy overlying load. The flat top surface may be provided by filling the space between the elevated sheets and the space between the elevated sheets and the ends of the bale. The space between the elevated sheets may be filled by sheets or cartons laid flatwise, and the space between the elevated sheets and the ends of the bale may be filled by spacing members of various types, one such type being hereinafter described in greater detail.

The sheets of the bale are held in position with some of the sheets elevated to create the recesses or channels on the underside of the bale primarily by reason of the frictional resistance to slippage of the sheets relative to each other created by the compression of the bale and the retention of its shape by use of straps, wires, or other securing means passing around the ends of the bale and over the top and under the bottom thereof. However, separate rigid, inverted U-shaped channel members may be inserted to line the recesses in the underside of the bale formed by the elevation of the sheets, the channel-shaped liners being made of metal or other rigid substance which prevents distortion of the channels when a heavy load is superimposed on the bale, or damage to the sheets when the lift fork is carelessly inserted therein by an operator.

The instant invention, therefore, facilitates insertion of the lift forks and minimizes damage to the bale which may result from contact with the lift elements. In other respects the invention has the same advantages as the invention described in said patent application, Serial No. 283,738.

Referring to the drawings:

Fig. 1 is a plan view of a common form of so-called knockdown carton blank which is employed widely for the packaging of many types of products, such as canned goods.

Fig. 2 is a perspective illustrating how the blank of Fig. 1 is arranged in collapsed sheet form enabling the carton to be readily set up, and which is the form in which the sheet is handled. For purpose of clarity, the view shows the sheet in partially opened position, it being understood that the collapsed carton is baled substantially flat.

Fig. 3 is a perspective of a bale of sheets formed in accordance with the present invention; the thickness of the individual sheets is exaggerated for purposes of clarity, and the number of sheets in the bale is reduced below the number normally in a bale, likewise for purpose of clarity.

Fig. 4 is a side elevation of a stack of bales such as might be arranged for storage in a warehouse. The lowermost bale is one formed in the manner of the bale of Fig. 3, whereas the superimposed bales are similar to those shown in said patent application, Serial No. 283,738. The number of bales in a stack is subject to wide variation, and for this reason the middle bale is broken away to signify that the number of bales in the stack is variable.

Fig. 5 is an end view of a spacer element interposed between the elevated sheets of the bale and the end of the bale, the spacer element being shown prior to the baling straps being applied.

Fig. 6 is a view similar to Fig. 5 but showing the dis-

tortion of the spacer after it is subjected to the stress of the baling strap.

Fig. 7 is a perspective of a modification of the invention, the bale being shown elevated above eye level so as to view the underside thereof. In this modification the recesses in the underside of the bale are lined with inverted U-shaped channel members.

In the accompanying drawings the invention is shown applied to knockdown cartons, but it will be apparent that the invention likewise has utility in the handling of other types of sheet material in which, preferably, the sheets of the bale are arranged to provide an edge supporting side formed with one or more channels.

The paperboard for forming the blank of Fig. 1 may be of any conventional weight or type such as either corrugated or solid paperboard. Blanks of this character vary widely in dimensions but are usually rectangular in shape, and provided with crease lines 2 for defining side walls 3, end walls 4, top and bottom side wall cover flaps 6, and top and bottom end wall cover flaps 7; the flaps being separated by cuts 8. Such blanks may be provided along the free end of an end wall 4 of the blank with a securing flap 9 adapted to be secured adjacent the free end of an end side wall 3, which when the blank is folded provides the knockdown carton sheet illustrated in Fig. 2. Instead of securing flap 9, a conventional corner tape may be provided to secure the end of end side wall 3 to the end of end wall 4.

In Fig. 2, the knockdown carton sheet is illustrated in partially collapsed form for purposes of clarity. When it is desired to form the set-up carton, the sheet of Fig. 2 is extended to form a rectangular box; and bottom cover flaps 6 and 7 are bent inwardly and adhesively secured together. After being filled with contents, the top cover flaps 6 and 7 are folded inwardly and secured together. As shown in the accompanying drawings, the collapsed knockdown sheet of Fig. 2 has a first pair of opposite edges 11 of two completely free thicknesses of material, which edges are the end extremities of the cover flaps 6 and 7 of the carton. Also, it has a second pair of opposite edges 12 which include the corner portions of the walls; such corner portions being of double thickness of material but not having independent free edges, as these corner portions include integrally joined hingedly connected portions.

The sheets illustrated in Fig. 2 are handled in bales of 150 or 200 or more at a time and are stacked together in overlying matched relationship, then bound together tightly in a compressed state to form a bale 15. The number of sheets bound in the bale is determined by limitations of space in the vehicle in which the bales are subsequently transported. Thus, as many sheets are baled together as can fit with economy of space in the truck, railroad car or other vehicle. Compression of the stack of sheets may be accomplished by any suitable baling apparatus. Two or more metal straps or wires 16 or other suitable fastening means may be used to bind the bale together, and the meeting ends of the fastening means may be joined in any suitable fashion. It is desirable that the edges 11, which are the extremities of the cover flaps of the carton, define or form the bottom 17 of the bale. The straps or wires 16 fit over the top 18 and under the bottom 17 and around the ends 19 of the bale.

The opposite sides 21 of the bale, which are also edge sides, could be employed as the supporting sides instead of bottom 17, and the baling straps 16 or wires passed around sides 21. However, such an arrangement is not as desirable as the arrangement illustrated in the accompanying drawings in that insertion of a lift fork under a side 21 might cause some damage to the corner portions 12, which form the corners of the set up carton, and hence damage thereto would weaken the carton, whereas damage when the bale is assembled as illustrated in the drawings does not weaken the carton.

In accordance with the present invention, a plurality of recesses 22 is formed in the bottom of the bale, the recesses being spaced apart the distance between the tines of a conventional lift fork employed in transporting the bale. The width of each of the recesses 22 is slightly greater than the width of the tine and the depth of the recess is slightly greater than the thickness of the tine. Hence, the operator of the lift truck may maneuver until the tines fit into the recesses 22, whereupon the bale may be lifted and transported by the truck. It will be noted that the tines fit over the baling straps or wires 16, the latter thus functioning to assist in preventing displacement of the bale from the lift fork.

The formation of each recess 22 is accomplished by elevating a plurality of sheets 23 higher than the adjacent sheets. The distance which the elevated sheets 23 is raised is equal to the depth of the recess, and the number of sheets elevated is sufficient to produce a recess of desired width. The sheets 23 which are elevated are retained in that position by reason of the frictional resistance to slippage of one sheet relative to the next, this frictional resistance being attained by reason of the fact that the baling straps or wires 16 secure the sheets tightly in close proximity.

It is desirable that the top of the bale 15 be substantially flat so as to provide a sound base for superimposed bales, such as the bales 24 illustrated in Fig. 4, the superimposed bales being desirably of the type disclosed in said patent application, Serial No. 283,738, and also to prevent the elevated sheets 23 from becoming pushed downwardly by a heavy overlying load, thus preventing slippage. In order to fill the depressions in the top surface 18 of bale 15 between the top edges of raised sheets 23 and between the raised sheets 23 and the ends 19 of the bale, various reinforcing filling means may be employed. A preferred means for filling the space between the raised sheets 23 is by placing a sufficient number of sheets 26 flat horizontally on top of the upper edges of the middle vertical sheets 27. The distance between the raised sheets 23, which distance is dependent upon the distance between tines of the lift fork, will ordinarily be about equal to one of the dimensions of a collapsed carton for canned goods and hence the space between the elevated sheets 23 can be substantially filled by placing the required number of sheets 26 flat on top of the center vertical sheet 27. The straps or wires 16 compress the horizontal sheets 26 sufficiently to prevent them from slipping out of place if the bale is tipped.

One of several means for providing a supporting surface along the top of the bale between the elevated sheets 23 and the ends 19 of the bale 15 is by employing paperboard spacers 31 such as shown in Fig. 5. The length of the spacers 31 is equal to the distance between the raised sheets 23 and the end 19 of the bale; the height of the spacers 21 is equal to the amount that the elevated sheets 23 are raised—i.e. the depth of the recess 22; the width of the spacers 31 is optional. The spacers 31 are formed by bending a blank of paperboard to form a hollow column, the meeting edges 32 being along the bottom. The spacers 31 are then placed in position before the baling straps or wires 16 are applied, one for each strap, and when the straps 16 are tightened, the spacers may be distorted to the shape shown in Fig. 6, and also in Figs. 3 and 7. However, even when thus distorted the upper corners 33 of the spacers remain substantially horizontal and provide a support for the superimposed bales 24. (See particularly Fig. 4.)

The filling means along the top of the bale is desirable in cases where the bale is intended to have a relatively large number of bales supported thereon, and thus be subject to a heavy load. However, if the overlying load is not too heavy, the filling means may be omitted as the tight frictional engagement between the sheets in the bale will serve to maintain the elevated sheets in position.

The modification of Fig. 7 differs from the foregoing

described bale in that an inverted U-shaped reenforcing channel 36, preferably of metal, is placed as a liner inside each channel-like recess in the bottom 17 of the bale 15*a* the channels 36 being retained in place by the baling straps or wires 16. Channels 36 help prevent the bale from being distorted when a number of bales are superimposed on top of the lowermost bale to thus preclude relative slippage between the elevated sheets and the other sheets. When these channels are employed, the filling means on top of the bale is unnecessary unless the overlying load in the bale is excessively heavy, as the channels will prevent the elevated sheets from being depressed. However, the filling means is illustrated in Fig. 7 as they may be used, if so desired. The channels further facilitate entry of the tines under the bale and reduce the likelihood of the sheets being damaged when the tines are inserted.

Each bale in a stack of bales may be formed similar to the bale 15 of Fig. 3 or the bale 15*a* of Fig. 7. However, this is unnecessary and, as shown in Fig. 4, the lowermost bale 15 only need be formed with bottom recesses 22 where the pile of bales is not too high. If the bales are piled high, an intermediate bale in the pile may be formed with the tine receiving recesses, to enable the pile to be handled in two sections by the lift truck. When the fork lift is placed under the recessed bale, the entire stack of bales thereover will be raised.

Although the foregoing description has been devoted primarily to a description of bales of knockdown paperboard cartons, other types of sheet material may be similarly baled. Also, although a bale with two recesses is disclosed, adapted for a two prong lift truck, a single wide recess may be provided in cases where the lift truck has a single wide lift element. As many lift element receiving recesses can be provided as there are lift elements on the lift truck.

I claim:

1. A bale of a large number of flat knockdown paperboard carton sheets in which each sheet is folded and has a first pair of opposite edges of two thicknesses of material which are the extremities of cover flaps of the carton, and also a second pair of opposite edges which include integrally joined hingedly connected portions which form corners of the carton walls, the sheets being arranged with said edges of said first pair defining opposite sides of the bale upon one of which the bale is adapted to be supported, some of said sheets at spaced locations being elevated with respect to other of said sheets to provide spaced recesses in such supporting side adapted to receive lift elements, and securing means around said opposite sides of said bale holding said bale in tightly compressed state and extending transversely across said recesses, the portions of the securing means extending across said recesses being in subtantially the same plane as the portions thereof extending across said supporting side.

2. A bale of a large number of flat knockdown paperboard carton sheets in which each sheet is folded and has a first pair of opposite edges of two thicknesses of material which are the free end extremities of cover flaps of the carton, and also a second pair of opposite edges which include integrally joined hingedly connected portions which form corners of the carton walls, the sheets being arranged with said edges of said first pair defining opposite sides of the bale upon one of which the bale is adapted to be supported, some of said sheets at spaced locations being elevated with respect to other of said sheets to provide spaced recesses in such supporting side extending entirely through the bale and which are adapted to receive lift elements, a securing member around said opposite sides of the bale holding said bale in tightly compressed state and extending transversely across said recesses, the portions of the securing member extending across said recesses being in substantially the same plane as the portions thereof extending across the remainder of said supporting side, and means on said bale cooperating with said securing member for substantially precluding slippage of the elevated sheets relative to the other sheets of said bale.

3. A bale of a large number of flat knockdown paperboard carton sheets in which each sheet is folded and has a first pair of opposite edges of two thicknesses of material which are the free end extremities of cover flaps of the carton, and also a second pair of opposite edges which include integrally joined hingedly connected portions which form corners of the carton walls, the sheets being arranged with said edges of said first pair defining opposite sides of the bale upon one of which the bale is adapted to be supported, some of said sheets at spaced locations being elevated with respect to other of said sheets to provide spaced recesses in such supporting side extending entirely through the bale and which are adapted to receive lift elements, channel shaped reenforcing means positioned in said recesses, and securing means around said opposite sides of said bale holding said bale in tightly compressed state and extending transversely across said recesses, the portions of the securing means extending across said recesses being in substantially the same plane as the portions thereof extending across the remainder of said supporting side.

4. The method of handling flat knockdown paperboard carton sheets for storage and transportation in which each sheet is folded and has a first pair of opposite edges of two thicknesses of material which are the free end extremities of cover flaps of the carton, and also a second pair of opposite edges which include integrally joined hingedly connected portions which form corners of the carton walls, comprising forming a bale of a large number of said sheets arranged with said first pair of opposite edges defining opposite sides of the bale upon one of which the bale is adapted to be supported and with some of said sheets of said bale elevated above said supporting side at spaced locations to provide spaced recesses in such supporting side extending entirely through the bale, holding the bale together in tightly compressed state by securing means extending around said opposite sides transversely across said recesses, the portions of the securing means extending across said recesses being in substantially the same plane as the portions thereof extending across the remainder of said supporting side, substantially precluding slippage of the elevated sheets relative to the other sheets of said bale by incorporating reenforcing means on said bale cooperable with said securing means, engaging said bale for transportation thereof by insertion of lift elements in said recesses and over said securing means, and elevating said lift elements to lift the bale.

5. The method of handling flat knockdown paperboard carton sheets for storage and transportation in which each sheet is folded and has a first pair of opposite edges of two thicknesses of material which are the free end extremities of cover flaps of the carton, and also a second pair of opposite edges which include integrally joined hingedly connected portions which form corners of the carton walls, comprising forming a bale of a large number of said sheets arranged with said first pair of opposite edges defining opposite sides of the bale upon one of which the bale is adapted to be supported and with some of said sheets of said bale elevated above said supporting side at spaced locations to provide spaced recesses in such supporting side extending entirely through the bale, holding the bale together in tightly compressed state by securing means extending around said opposite sides transversely across said recesses, the portions of the securing means extending across said recesses being in substantially the same plane as the portions thereof extending across the remainder of said supporting side, substantially precluding slippage of the elevated sheets relative to the other sheets of said bale by incorporating channel shaped reenforcing means in said recesses co-

operable with said securing means, engaging said bale for transportation thereof by insertion of lift elements in said recesses and over said securing means, and elevating said lift elements to lift the bale.

6. A bale of a large number of flattened knockdown paperboard carton sheets for handling with a lift truck or the like, each flattened carton sheet having a first pair of opposite edges of two thicknesses of material which are the free end extremities of cover flaps of the carton, and also a second pair of opposite edges which include integrally joined hingedly connected portions which form corners of the carton walls, the sheets being arranged with said edges of said first pair defining opposite sides of the bale upon one of which the bale is adapted to be supported to provide the bottom of the bale, the length of the bale between its ends formed by the outermost flattened cartons of the bale being greater than the distance between said opposite sides, some of said sheets at spaced locations being elevated with respect to other of said sheets to provide spaced recesses in such bottom supporting side extending entirely through the bale and which are adapted to receive lift elements, and a securing member around said bale holding said bale in tightly compressed state, said securing member extending across said bale ends and across said opposite sides of the bale transversely across said bottom recesses, the portions of the securing member extending across said bottom recesses being in substantially the same plane as the portions thereof extending across the remainder of the bottom of said bale.

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