July 21, 1959 H. W. WILSON 2,895,608

SELF-PALLETIZED PACKAGE

Filed April 9, 1957 4 Sheets-Sheet 1

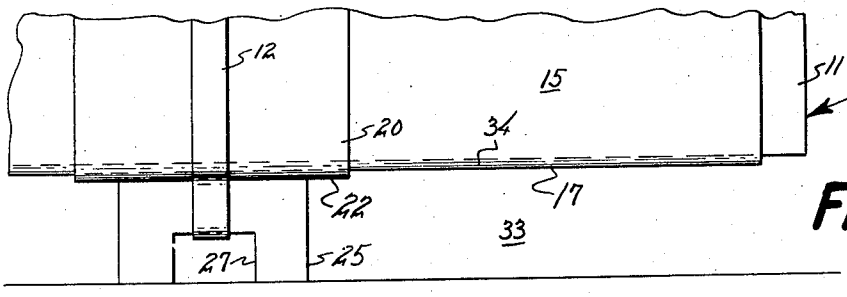
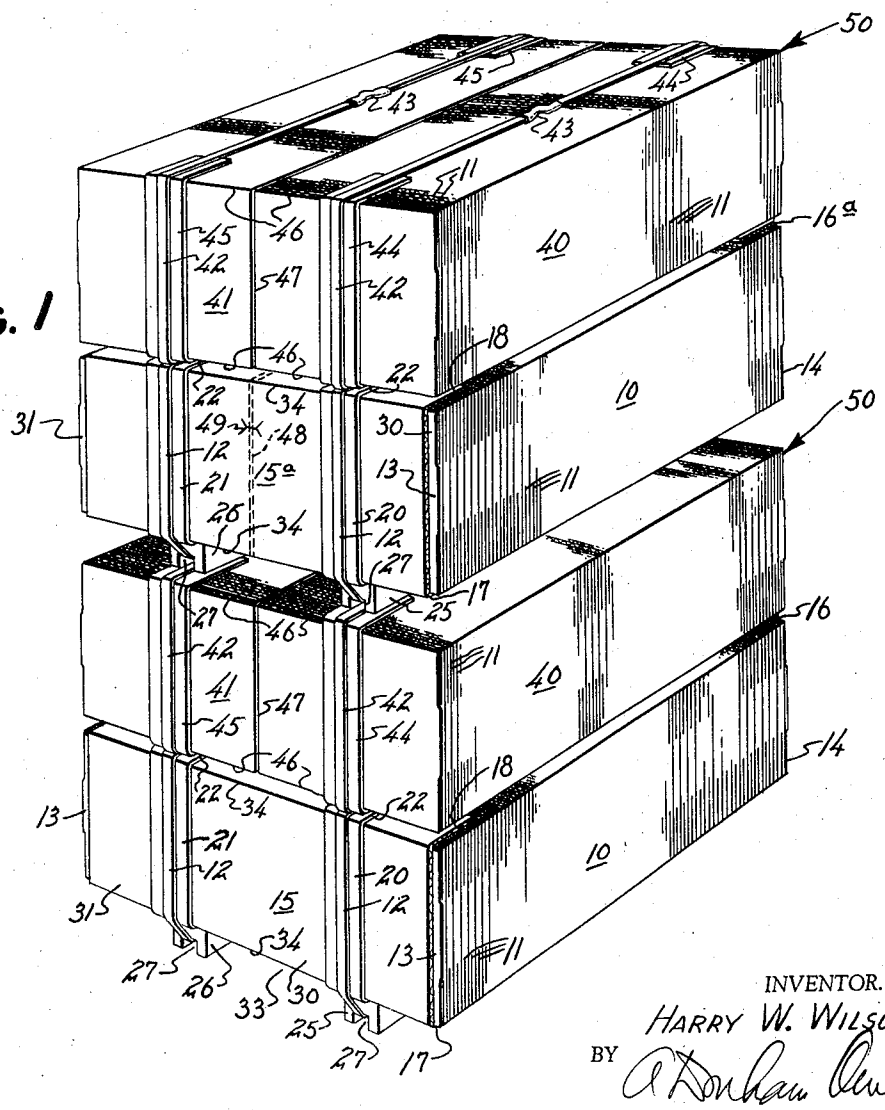


FIG. 5

FIG. 1



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SELF-PALLETIZED PACKAGE

Filed April 9, 1957 4 Sheets-Sheet 2

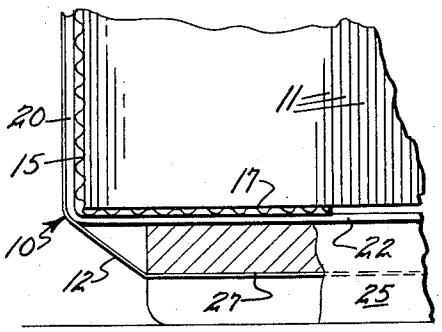

FIG. 4

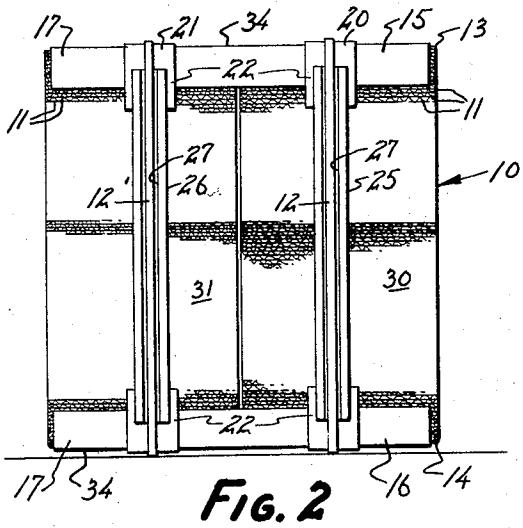

FIG. 2

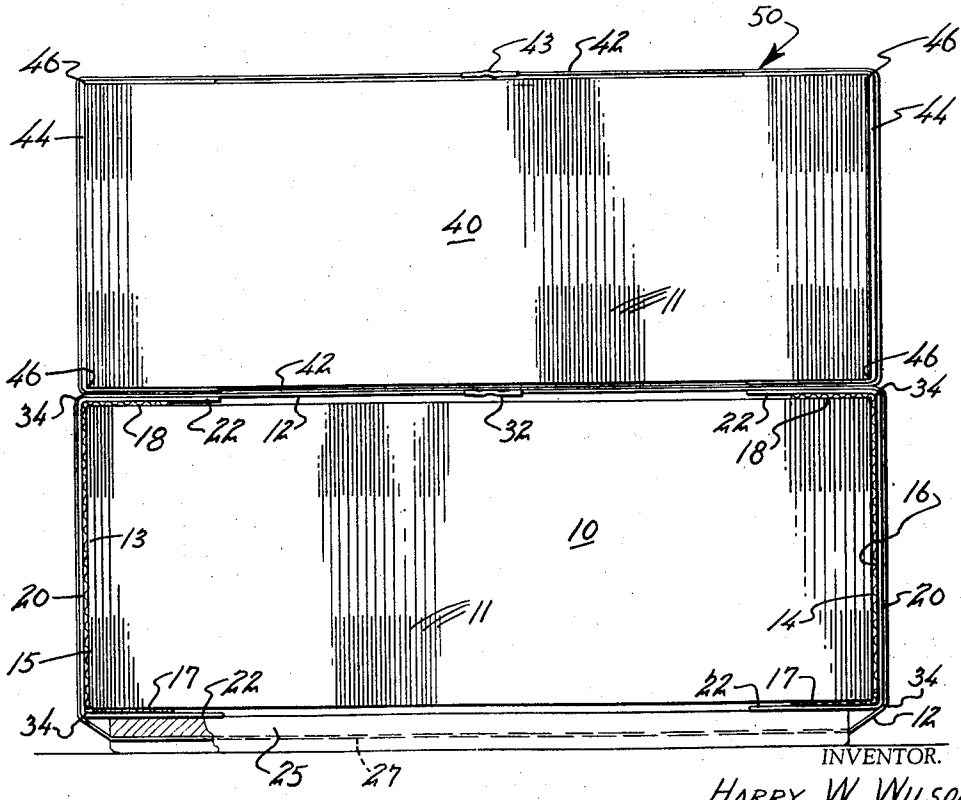

FIG. 3

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Filed April 9, 1957 4 Sheets-Sheet 3

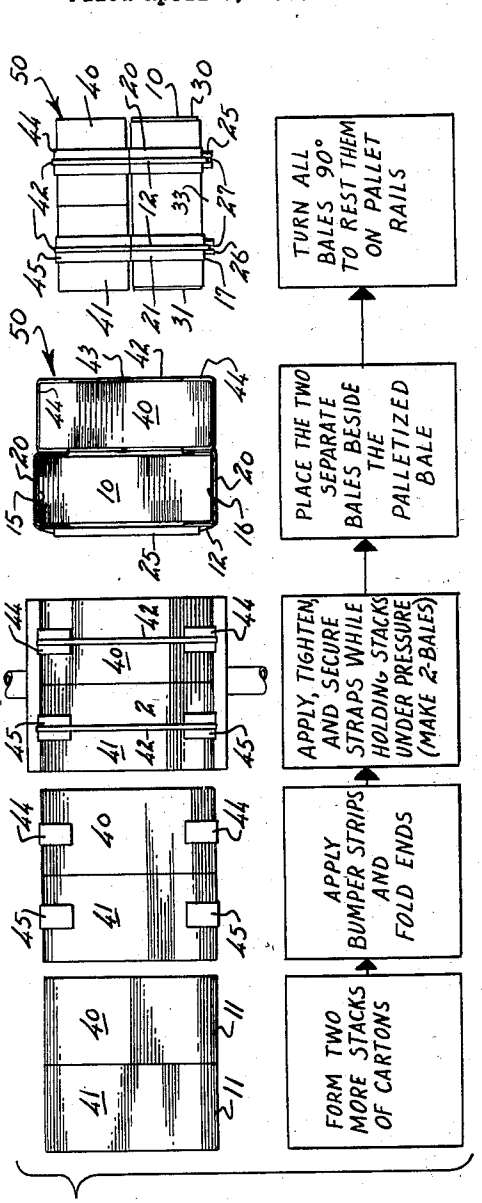

FIG. 7

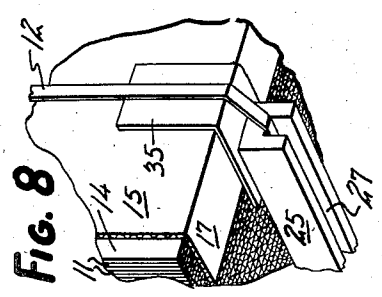

FIG. 8

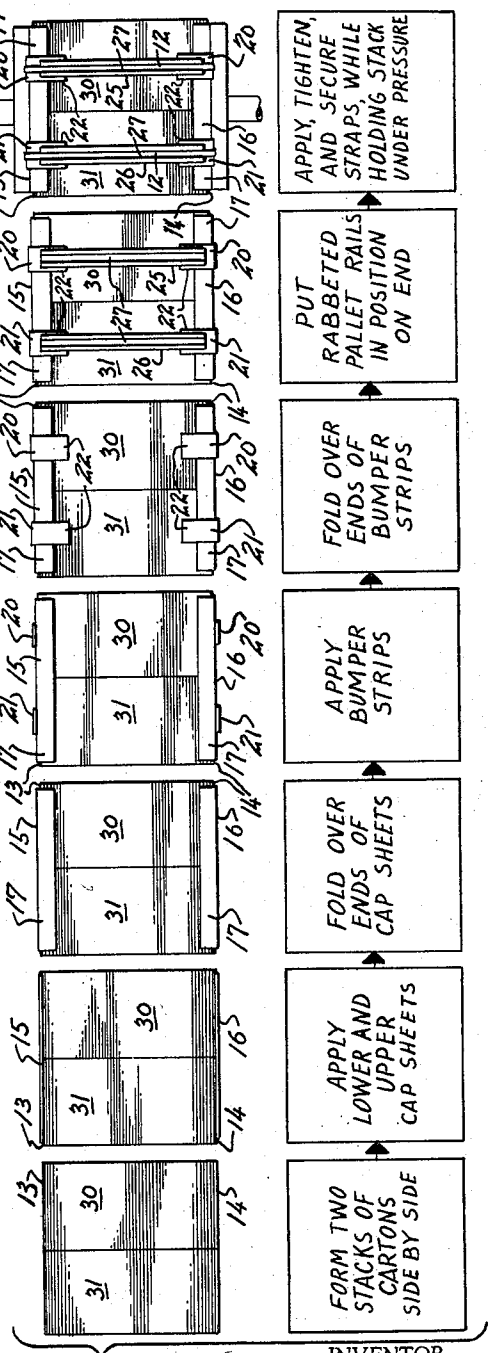

FIG. 6

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SELF-PALLETIZED PACKAGE

Filed April 9, 1957 4 Sheets-Sheet 4

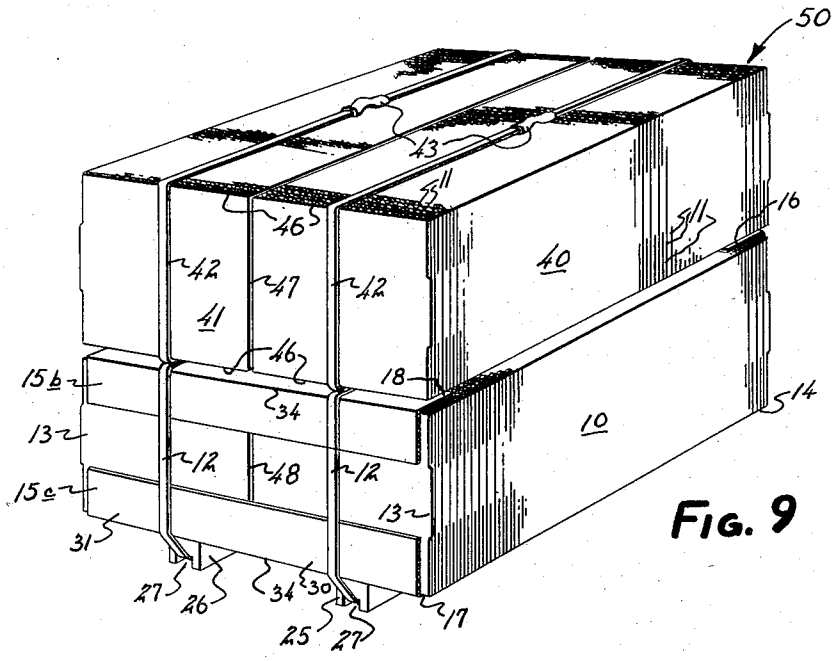

FIG. 9

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United States Patent Office

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Patented July 21, 1959

2,895,608

SELF-PALLETIZED PACKAGE

Harry W. Wilson, Millbrae, Calif.

Application April 9, 1957, Serial No. 651,615

13 Claims. (Cl. 206—56)

This invention relates to a novel package of collapsed cartons. This application is a continuation in part of co-pending application Serial Number 592,185, filed June 18, 1956, now abandoned.

Corrugated paper boxes and cartons are commonly shipped from the manufacturer to the users in collapsed form, which is known in the industry terminology as "K.D.F.," i.e., "knocked down flat." The flat blanks have been properly slotted, scored, folded, and the two end panels connected by methods that are conventional in the industry, so that all the user has to do is to open the K.D.F. box out and fold over the bottom and top flaps of the integral container.

Heretofore, the shipping of these K.D.F. cartons has presented a packaging problem. The method currently used in the prior art employs small bundles of about twenty-five cartons per bundle, each bundle being secured by wire or twine. This method usually required handling of the bundles by hand, which was costly, or a number of bundles were stacked flat and secured to wooden pallets, usually of the so-called returnable type but sometimes of the non-returnable type, for handling by fork-lift trucks. The use of returnable pallets is expensive, due to the necessity of recording their whereabouts and the costs of maintain them in proper condition and of returning them to the shipper. Also, the shipper must maintain a considerable investment in his pallets to permit circulation and still have enough on hand for each shipment. Non-returnable pallets have heretofore been still more expensive per use and have not been used to a great extent.

Moreover, standard pallets usually do not conform to the dimensions of the bundled cartons, and consequently when the cartons are stacked on the pallet do not fill the surface of the pallet or else overhang the edges. In either event, space is wasted and it is not possible when using standard pallets to put the maximum number of cartons in the shipping space available in rail cars and trucks.

Thus the use of pallets has involved stacking the corrugated boxes by hand on the pallets. The pallets have been an added expense, their use brought inefficiencies in utilization of shipping space, their return to the manufacturer was a nuisance while, if they were not returned, the manufactuer had to buy new ones for each shipment.

One object of this invention is to provide a novel package for K.D.F. corrugated cartons.

Another object of the invention is to provide a self-palletizing bale of K.D.F. cartons.

Another object of the invention is to provide a novel pallet load package that is quickly, easily, and economically assembled.

Another object of the invention is to provide the maximum in load and weight efficiency while giving adequate protection to corrugated fibreboard cartons in their flat state.

Another object of the invention is to provide an economically disposable palletized package assembly.

Another object of the invention is to provide a palletized shipping unit load that enables control of package dimensions so that the shipping space in rail cars and trucks can be utilized with the greatest efficiency.

My invention is characterized by several new features brought together in combination to produce important new results. For one thing, the K.D.F. cartons in my finished bale are stacked on edge. In order to make this feasible they have to be strapped while they are under pressure; the pressure exerted by the strapping is not nearly enough to produce a truly tight package. My invention calls for exerting pressure at least great enough to squeeze out the air between the cartons and to make all the surfaces equiplanar, while the pressure is still less than would damage or crush the cartons. As a result, the pressure forces the K.D.F. cartons together and, once forced together with unevenness and waste air eliminated, they help to maintain themselves together so that there is no undue burden on the straps. The straps retain them as a bundle, but do not apply additional pressure. This is very important and is greatly different from the prior-art approach, where the stacking was usually done by gravity and where the straps themselves applied whatever pressure was applied. This feature will be explained in greater detail below. The method involved in this invention forms the subject matter of a divisional application, Serial No. 696,304, filed October 21, 1957.

Another important novel feature of the invention is that there is no pallet in the usual sense; that is, no separate pallet on which the goods are placed. In my invention there is no pallet separate from the package. The bale is self-palletized by straps that hold a pair of runners to the stack. The two runners hold the bale off the ground, but they are not a pallet; the pallet is the bale with the runners.

Another very important feature of the invention is that it makes possible the provision of self-palletized bales of K.D.F. cartons that are too small to be handled in a single stack by fork-lift trucks, since the forks are normally about 28" to 32" apart. This is accomplished by a novel double stack of the smaller cartons, joined only by locking sheets that are strapped into the bale. By pitting against each other, through the locking sheets, the forces that tend to cause the bale to come apart, the invention holds the bale together. Use is made of the high shear or tensile strength of sheet material when subjected to stretching forces as compared with the weakness of the same material in the face of bending moments. By this novel arrangement, which will be explained in more detail below, it becomes possible to use corrugated paper as the locking sheets, with resultant savings in material costs.

The results of the invention are very surprising in that the frail-appearing bales can be stacked many tiers high. For example, they are often stacked ten tiers high so that the bottom runners carry a load of about 1400 pounds per square foot, or more, without damage to the bottom bales.

Another feature of the invention is that the dimensions of the package are controlled along an axis parallel to the axes of the forks of the lift truck as they enter the pallet, so that maximum efficiency in loading becomes possible. This feature likewise is explained in detail below.

An additional feature of the invention is the provision of a divisible package, capable initially of being handled by fork-lift trucks and capable, when divided, of being handled by hand trucks.

Other objects and advantages of the invention will appear from the following description of a preferred embodiment given in accordance with 35 U.S.C. 112.

In the drawings:

Fig. 1 is an isometric view of a stack of K.D.F. cor-

rugated fibreboard cartons. Two shipping and storing units embodying the principles of the present invention are shown, each unit comprising a self-palletized bale on the lower layer and two half-size bales as the upper layer. The self-palletized bales shown each include two stacks of cartons like those on the upper layer.

Fig. 2 is a bottom plan view of one of the self-palletized carton bales of Fig. 1. It also represents an end elevation view of the bale as made by the preferred method, just before tipping.

Fig. 3 is a view in side elevation and partly in section, on an enlarged scale, of a storing and shipping unit embodying the invention, with the lower layer being self-palletized and the upper layer unpalletized, the two layers being normally handled as a unit.

Fig. 4 is a fragmentary view partly in elevation and partly in section of the lower left corner portion of Fig. 3, shown on a further enlarged scale and taken along the line 4—4 in Fig. 2.

Fig. 5 is a fragmentary view in front elevation of a portion of the bottom part of the self-palletized bale, near one of the runners that serve as pallet boards or rails.

Fig. 6 is a flow sheet illustrating a preferred method of making a self-palletized bale, according to the present invention.

Fig. 7 is a flow sheet illustrating a preferred method of making a three-bale unit according to the present invention.

Fig. 8 is a fragmentary perspective view of a portion of a bale embodying a modified form of the invention.

Fig. 9 is a view similar to Fig. 1 of a modified form of storing and shipping unit also embodying the principles of this invention.

A self-palletized bale **10** embodying this invention comprises an appropriately (for maximum utilization of truck or rail car space) sized stack or stacks of collapsed or K.D.F. corrugated paper or fibreboard boxes **11** secured together on edge by two steel bands or straps **12, 12** of conventional type but used in a novel manner according to a novel method, and resulting in a new kind of package.

While there may be only a single stack of K.D.F. cartons in the bale **10**, if these cartons are so large that pallet runners can be spaced far enough apart beneath them, an important feature of this invention is its provision of a bale **10** having two stacks **30** and **31** of cartons **11** side by side, with one pallet runner under each stack. To make such a double-stack unit successful, there has to be a way of locking the two stacks together and of preventing the forces of cleavage from tearing apart the locking members. For this purpose, the front and rear ends **13, 14** of the carton bale **10** are covered by two oversize locking sheets **15, 16**, preferably of corrugated paper, though for some purposes they may be made of fibreboard or other suitable material. Each cap sheet **15, 16** is folded over against the carton stacks at both its ends to form flanges **17, 18** to form a longitudinal lock of the two stacks **30** and **31** of corrugated paper cartons **11** which comprise the bale **10**. The sheets **15, 16** are not mere cover sheets, nor are they present merely to prevent the straps **12** from tearing the edges of the cartons **11**. When the flanges **17** and **18** are folded, the sheets **15, 16** become flanged tension sheets, or shear-prevention sheets, or load-carrying locking sheets, that make a unitary bale possible. However, fuller explanation of how they work must be deferred until the remainder of the bale has been described.

Smaller overlength reinforcing or bumper strips **20, 21**, preferably of corrugated paper or similar material, are also provided at each end over the cap sheets **15, 16** and beneath each of the steel bands **12**. Portions **22** at each end of the bumper strips **20, 21** are likewise turned over against the carton stacks. The primary purpose of the bumper strips **20, 21** is to prevent the bands **12** from tearing the locking sheets **15, 16**, though they also give some protection to the carton edges. Their function will be better understood after a discussion of the locking sheets **15, 16** which must, for the present, be deferred. In place of the bumper strips **20, 21**, four short corner or L-shaped pieces **35** may be used for each band **12**, if desired, as shown in Fig. 8, though the structure of Figs. 1–5 is preferable since it takes fewer pieces, is easier to install, and is much easier to align.

A pair of wooden boards, pallet rails, or runners **25, 26** is provided along the full length of the bottom of the package **10**. The runners **25, 26** are preferably rabbeted lengthwise to provide a long axial or longitudinal groove or rabbet **27** on their outer surface, and the groove **27** receives the steel band **12** and holds it in the correct alignment. At the same time, the runners **25, 26** help to prevent the band **12** from damaging the carton edges. The alignment of the bands **12** maintains the runners **25, 26** parallel to each other and spaced apart a distance proper to the use of fork-lift trucks. While, in some sizes, it is possible that the runners **25, 26** will be centered relatively to their respective stacks **30** and **31**, this is not usually true. Usually, and preferably, the runners **25, 26** are positioned a little outside the centerlines of the stacks **30, 31** so that actually the forks of the lift truck will be positioned at these centerlines when they lift and move the bale **10**. So the bands **12** are all that secure the pallet rails **25, 26** to the package **10**. Without the package **10**, the boards **25, 26** are loose, and there is no pallet. Without the runners **25, 26**, there is no pallet. The pallet exists only as a combination of the cartons, bands, and boards; and (in double-stack bales) the locking sheets. The bands **12** are joined in the normal manner by band locks **32**, such as are made by commercial strapping machines.

It will now be seen from Fig. 2 that where there are two stacks **30, 31** of cartons **11** in the one bale **10**, only the flanged locking sheets **15, 16** at the ends link the two stacks **30, 31** together. The oversize sheets **15, 16** are able to link the two stacks **30, 31** together and hold the bale **10**, not only because of their having strength in themselves, but also because they are in combination with the cartons **11** and bands **12**, and because the alignment of the two runners **25, 26**, usually just outside the centerlines of their respective stacks **30, 31**, centers each stack on a fork of the forklift truck, so that the stacks **30, 31** do not tend to slip away from each other.

More important, however, is the effect of the flanges **17, 18** in conjunction with the sheets **15, 16**. These flanges **17** and **18** serve to pit against each other the disruptive forces that tend to split the bale **10** in two. Looking for the moment at Fig. 1, it can be seen that the bottom flanges **17** are subject, when the bale **10** is stored, to rotational forces of each stack **30, 31** inward about the runners **25, 26** as pivots, especially since the runners **25, 26** are preferably located out beyond the centers of their respective stacks **30, 31**. In effect this is a force acting from the upper corners down to the center of the lower flange **17**. This force, however, is apposed by a force tending to stretch the flange **18**. The horizontal components of force at the lower flange **17** are therefore inward toward the center, while the horizontal components at the upper flange **18** are outward from the center.

Now, note that the corrugations of the sheets **15, 16** run horizontally, widthwise of the stack. It is well known that even an ordinary sheet of paper, though easily torn apart by forces acting perpendicular to the sheet, has great tensile strength against forces trying to stretch the paper in its own plane. That is, in general, what is happening at the upper flange **18** when the bale **10** is stored. So the corrugated sheets **15, 16**, with the corrugations extending widthwise, are well able to resist this stretching force and therefore to give strength to the bottom flanges **17**. It is very important, however, that each flange **17, 18** is supported also by the normally vertical portion of the sheets **15, 16**, for this means that each

of them acts like an L-beam instead of like a flat strip and so do not bend readily. So they are given great rigidity by the resistance of the vertical portions to shearing forces acting along their planes. This would be true whether the cap sheets **15**, **16** were unitary, as shown, or whether it were separated into two L-shaped strips **15***b* and **15***c*, at each edge, as shown in Fig. 9, but the unitary structure is both somewhat stronger and easier to apply. (It will be noted in Fig. 9 that the L-shaped strips have also been omitted, since they are not always necessary and since they would tend to cover up and obscure portions of the figure.)

The foregoing paragraph indicates that the flanges **17**, **18** should have substantial width, preferably at least 2". Most flanges **17**, **18** are preferably about 4" to 6" wide and may, of course, be as wide as desired. For some uses, and with some material, they may be narrower than 2", but that is not generally advisable. In any event, in order to hold them as flanges, the flanges **17** should be wide enough so that when they are folded under, they are sandwiched between their runners **25** and **26** and the associated stacks **30** and **31** and are locked in place.

As the foregoing demonstrates, the locking sheets **15**, **16** may be made from corrugated paper because they have to resist only forces along their plane. This points out the importance of the bumper strips **20**, **21** (or **35**) in preventing any tearing of the locking sheets **15**, **16**, for once torn they would not be strong and able to resist shear. Also, the preferable widthwise direction of corrugation helps to prevent the bands **12** from tearing them.

As shown in the drawings, the assembled bale **10** serves as its own pallet, the two runners **25**, **26** holding the package off the ground and giving space at **33** for the entry of the forks. Thus, the combination of locking sheets, cartons, runners and bands results in a firmly secured package that can be handled directly by lift trucks. By simply cutting the bands **12**, the package is ready for use, and the runners, straps, locking sheets, and bumper strips are not expensive; so they may be thrown away, or all parts except the straps may, if desired, be re-used. It is obvious that the two rabbeted boards **25**, **26** are much less expensive than a complete pallet; and, in fact, the total cost of the locking sheets, bumper strips, straps and runners is only a fraction of the cost of a pallet. Moreover, the bale **10** is much more convenient than a conventional pallet holding a load of tied packages of cartons. There is much less excess weight for shipping.

There is also much less waste space in shipping or storing since there is no empty space on the pallets nor is there any overhang, and since the space **33** provided by the runners **25**, **26** is no more than is needed and convenient for entry of the forks of the lift truck.

Moreover, the dimensions of the package are under quite a bit of control, especially the dimension that counts most. Thus, although the height of each package is determined by the width or length of the K.D.F. carton, height is not usually a serious limiting factor, since the cartons are frequently carried on flat-bed trucks or rail cars. The width of each package is also determined by the carton size, but it is not critical either. The length, the important thing, is selected by how many cartons are in the stack, since the thickness of each carton is relatively small; so the length can be varied as desired. For example, each package may be exactly 48" long or exactly two packages wide, when the standard legal width of the trucks is 96". Or any other desired dimension can as easily be achieved. Moreover, this dimensional control is along the correct dimension, parallel to the forks of the lift truck instead of transverse to them, and so is very convenient for loading flat-bed trucks. In that way, the maximum load can be loaded in every instance; for example, by two rows of packages, each row extending 48" across the 96" truck width, or

exactly half way, no matter what the size of the K.D.F. carton is.

This dimension control again brings up the fact that the K.D.F. cartons are stacked on edge, for without this stacking on edge, dimensional control is not possible, and height is the least important dimension to control.

On-edge bales are feasible only because the stacks are pre-pressurized, that is, are held under high pressure before and during the strapping condition. Otherwise, the cartons tend to expand or incline to one side and give poor support. It is once again like the old parable of the package of fagots bound together versus a series of individual sticks. The individual cartons are not very stable on edge, but many cartons pressed together are very stable indeed, and huge stacks of many tiers are quite practical.

The pressure must be much greater than the pressure normally exerted by any strapping gun I know of. The minimum pressure usable is at least an amount necessary to squeeze out the air between the cartons so that they will hold themselves together, enough to flatten them and press out all unevenness, make all surfaces equiplanar and each carton in firm contact with the adjacent carton. For corrugated paper K.D.F. cartons, this minimum pressure will be about 4 p.s.i.a., though it may be lower or higher for packaging other materials.

The maximum pressure usable is simply that which the material will sustain without damage, such as being crushed so that the corrugations are destroyed. Normally, for corrugated paper, that will be about 15 p.s.i.a., though it may be different for different materials, and there will be differences in corrugated paper due to the different type of flutes in use, etc. For K.D.F. cartons **11** that are ten square feet in area, that is a range of about 5600 pounds to about 21,000 pounds per carton. Excellent results for many cartons are obtained at pressures of 8–12 p.s.i.a.

This pre-pressurization helps the bands **12**, for they have less to hold, once the cartons are so pressurized. Also, it makes possible the very high on-edge stacking. For lower stacks, less pressure can be used, but the bale **10** will not be as tight.

It will also be seen in the drawings that the bale **10** of this invention can be used in conjunction with a pair of bales **40**, **41** having no boards and comprising pre-pressurized (as above) single stacks of cartons **11**, each held together preferably by only a single band **42**, identical in type to the bands **12**, and locked at **43**. Bumper strips **44**, **45** substantially identical to the bumper strips **20**, **21** may be used to protect the corners **46** and ends or faces of the packages **40**, **41**, just as the corners **34** and faces of the bale **10** are protected. This means a saving in locking sheets and runners because the bales **40**, **41** may be packed on top of each bale **10** of this invention to provide a basic unit **50**—which is thenceforward always handled as a unit by the fork lift truck. In every unit **50**, one or more layers of unpalletized bales **40**, **41** are supported and carried by a lower layer, comprising a self-palletized bale **10**. Units **50** may be stacked on each other as shown in Fig. 1. As implied, there may be one, two, or more upper layers for each lower layer, determined partly by the size of the K.D.F. carton concerned.

Where desired, as with large cartons, there may be only one stack in the bale **10**, and one bale **40** will then combine with one bale **10** to comprise the unit **50**. Also, more stacks per bale **10** or more bales **40**, **41**, etc., may again be used, if feasible.

A small portion of a modified form of bale is shown in Fig. 8. Here, the only change is that instead of using the bumper strips **20**, **21** (two for each strap **12**), L-shaped strips **35** are used (four for each strap **12**). These L-shaped strips **35** are entirely suitable and have the advantage of lowering the material cost somewhat;

but they usually take more time to install, so the strips **20, 21** are generally to be preferred.

The preferred method for making the article of the present invention, which has been explained somewhat already and is claimed in divisional application Serial No. 696,304, filed October 21, 1957, comprises the following steps shown in Figs. 6 and 7.

A plurality of K.D.F. cartons **11** are formed into one or more (preferably two) stacks **30, 31**. The cartons **11** in the stacks **30, 31** may be on edge, as in the finished bale **10**, or they may more conveniently be horizontal, as in Fig. 2 and in Fig. 6.

The oversize locking sheets **15, 16** are placed at each end **13, 14** to hold the one or more stacks **30, 31** together. Their ends **17, 18** are folded over against the stack. In the preferred method (see Figs. 2 and 6) one locking sheet **16** will be beneath the stacks **30, 31** and one sheet **15** will be on top of them. In either event, the side edges of the locking sheets **15, 16** are preferably not oversize, only its lengthwise edges, and these are the ones folded against the stack. If desired, the lower cap sheet **16** may be placed down first and the stacks **30, 31** built upon it, or the stacks **30, 31** can be made first and lifted up for insertion of the cap sheet **16**.

Corner and end reinforcements are next provided, preferably the bumper strips **20, 21** at each end, or else by the L-shaped strips **35**. In the preferred method the strips are inserted horizontally above the top of the package and below the bottom. Their overlength ends **22** are folded over. Preferably, the bumper strips **20, 21** are aligned slightly off-center with respect to their respective stacks **30, 31**, as explained previously.

A pair of parallel rabbeted boards or runners **25, 26** are positioned, rabbeted face out, along the end of the package which will eventually serve as the lower edge. The runners **25, 26** overlie the folded ends **17** and **18** of the cap sheets **15, 16** and the folded ends **22** of the bumper strips **20, 21**. They are spaced so as to be symmetric with the package, preferably out just beyond the center of their respective stacks **30, 31** and a distance apart from each other suitable for the entry therebetween of a fork-lift truck. Preferably the package is at this time on one side, as shown in Figs. 2 and 6, with one cap sheet **16** on the bottom and with the boards **25, 26** extending vertically along a vertical end of the package. Later, the package will be turned over, and the boards **25, 26** will then be on the bottom.

While the boards **25, 26** are held in place and while the stacks **30, 31** are held under pressure (as described before, and preferably at a pressure between 4 p.s.i. and 15 p.s.i. for corrugated paper cartons), preferably in a press, the pair of metal bands **12** is passed around the bale **10**. The bands **12** are channeled in the groove **27** in the runners **25, 26**. The bands **12** also overlie the bumper strips **20, 21** which protect the corner edges **34** and keep the bands **12** from biting into the locking sheets **15, 16** and tearing them, or from damaging the cartons **11**. They are preferably off-center with respect to the stacks **30, 31**, as explained before. Then the ends of the bands **12** are secured together at **32** to make a tight bale **10**.

For some uses, the bale **10** may now be turned over 90°, so that it rests on the boards **25, 26**, thereby becoming a self-palletized load. This step is, of course, omitted when the cartons **11** are stacked on edge. It is also deferred when making the unit **50**.

For making a double unit **50**, two other bales **40, 41** are made as shown in Fig. 7, by stacking K.D.F. cartons, applying a bumper strip **44** or **45** at or reasonably near the centerline of each end of each stack, applying pressure as stated heretofore, and then applying a strap **42** around each stack, the corners **46** being protected by the bumper strips **44, 45**, or by L-shaped strips like the strip **35**.

The bales **40, 41** are then placed beside the bale **10**, preferably before the bale is turned, in the preferred method. However, the bale **10** may be turned over before the bales **40, 41** are on top of it, if desired. In any event, the final step in the preferred method is to turn over the three bales **10, 40** and **41**, to put the unit **50** on the pallet boards **25, 26**.

One further problem solved by the present invention should be mentioned. Many small manufacturers do not have fork-lift trucks and handle the cartons on hand trucks. But a load that can easily be handled by a fork-lift truck is much too heavy for normal hand-truck use, and so the problem is to provide a package that can be adapted easily for use by both fork-lift and hand trucks. In the case of the packing unit shown at the bottom of Fig. 1, this may be done by taking a knife or other cutting tool and splitting the cap sheet **15** along a line coplanar with the plane where the stacks **30** and **31** meet, or in other words an extension of the line **47**, where the two stacks of the upper layer meet.

However, a still more convenient and adaptable package is shown in the upper part of Fig. 1, where cap sheets **15a** and **16a** are each provided with a tear strip **48**, as a severing means. By simply pulling the tear strip **48**, the two stacks **30** and **31** are readily divided from each other. The tear strip **48** may be a strip of strong tape on the inner face of each sheet **15a** or **16a**, with starting tabs provided by cuts **49** through the sheets. The two tabs are then grasped and pulled in opposite directions along the tear strips **48** to sever the bale. In fact, it is not essential that the strip **48** be torn along its full length, since all that is necessary is to tear it to the point where the weight of the package itself will tear the remainder, and this is readily accomplished. Thus the unit **50** at the upper half of Fig. 1 is adaptable for either fork-lift trucks or hand trucks. It may be handled by the carton manufacturer by fork-lift trucks in his warehouses and when loading it on trucks or rail cars, and it may be even unloaded later on by fork-lift trucks if desirable, but from that point on it can be handled by hand trucks, once the tear strip **48** has been pulled to divide the cap sheets **15a** and **16a** into two pieces.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting. For example, any of the many well-known types of tear strips may be used in place of the one shown. Also, the rabbets in the boards, while preferable and very convenient, are not essential. Furthermore, the units may be three or four or more layers high instead of two layers high.

I claim:

1. A shipping package for cartons, comprising two prepressurized stacks of K.D.F. corrugated paper cartons side by side compressed and vertically on end; a pair of oversize corrugated paper locking sheets overlying the opposite vertical end faces of said stacks and having flanged portions thereof folded back over marginal portions of the top and bottom of said stacks; a plurality of bumper strips of corrugated paper covering spaced-apart portions of the upper and lower corner edges of said locking sheets; a plurality of rabbeted runners on the bottom of said package supporting said package, with the rabbets on the lower surfaces thereof, said runners being spaced apart parallel to each other, each extending between and beneath the bumper strips; and a corresponding plurality of metal bands around said package, each said band lying in the rabbet of one said runner and passing around said locking sheets and bumper strips, each bumper strip lying inside said band, whereby the package is self-palletized.

2. A shipping package for cartons, comprising a pair of stacks of K.D.F. corrugated paper cartons side by side;

lying vertically on end; a pair of oversize corrugated paper locking sheets overlying the opposite vertical face ends of said stacks and having portions thereof folded back over marginal portions of the top and bottom of said stacks; a plurality of rabbeted runners on the bottom of said package supporting said package, with the rabbets on the lower surfaces thereof, said runners being spaced apart parallel to each other, each extending between and beneath the folded-over portions of said locking sheets; and a corresponding plurality of metal bands around said package, each said band lying in the rabbet of one said runner and passing around said locking sheets, each locking sheet lying inside said band, whereby the package is self-palletized.

3. The package of claim 1 wherein said locking sheets are provided with means for severing each of them along the plane where the two stacks abut each other, so that the original package can be handled by fork-lift trucks and, when said locking sheets are severed, the package splits in two and each half can be handled by hand trucks.

4. A shipping package for cartons, comprising two stacks of K.D.F. corrugated paper cartons side by side with the cartons lying vertically on end; flanged tension means extending along the upper and lower edges of the opposite vertical ends common to both said stacks; a plurality of runners on the bottom of said package, parallel to and spaced apart from each other, each extending between said tension means at opposite ends and holding said tension means against said stacks; and a plurality of metal bands around said package and over said runners, securing said runners to said package and forming the whole into a self-palletized package.

5. The package of claim 4 wherein said flanged tension means are severable to divide said package into two packages of one stack each.

6. The package of claim 4 wherein said flanged tension means comprises a pair of oversized corrugated paper locking sheets on the vertical ends common to both said stacks and having flanges thereof folded back on marginal portions of the top and bottom of said stacks.

7. The package of claim 4 wherein said flanged tension means comprises two pairs of L-shaped strips having first vertical flanges overlying the opposite vertical ends common to both said stacks along their upper and lower edges and second flanges extending generally horizontally, one underneath the bottom of said stacks and the other over the top of said stacks.

8. A shipping package for cartons, comprising two stacks of K.D.F. corrugated paper cartons side by side with the cartons lying vertically on end; a pair of flanged corrugated paper locking sheets overlying the opposite vertical ends of said stacks, each locking sheet lying in a plane generally parallel to the planes of said cartons and having its flanges extending horizontally to cover a marginal portion of each of the top and bottom of said stacks; four long narrow bumper strips of corrugated paper parallel to and spaced apart from each other and generally vertically disposed outside and against each locking sheet and with end portions folded over the flanges of said locking sheet; two runners on the bottom of said package, each with a rabbeted lower surface, said runners being parallel to and spaced apart from each other, each extending between and beneath the folded-over portions of said bumper strips at opposite ends; and a pair of metal bands around said package, each said band extending along the rabbet of one said runner and overlying said locking sheets and bumper strips to form a self-palletized package.

9. The package of claim 8 wherein each locking sheet is provided with a central tear strip for dividing it into two pieces along the plane where the two stacks meet.

10. A shipping package for cartons, comprising a plurality of substantially identical stacks of K.D.F. corrugated paper cartons, said stacks being disposed side by side against each other, each carton therein lying on end in a generally vertical plane, with the ends of said stacks generally coplanar; a pair of oversize corrugated paper locking sheets covering the two opposite vertical ends of said stacks and joining said stacks together, each locking sheet having marginal portions thereof folded back horizontally against marginal portions of the top and bottom of said stacks; a plurality of bumper strips of corrugated paper extending generally vertically and parallel to and spaced apart from each other outside and against each locking sheet, symmetrically located with respect to the package and with end portions folded respectively over the top and under the bottom of the package and respectively overlying and underlying said locking sheet folded-over portions; a plurality of runners on the bottom of said package, parallel to each other, each extending between and beneath the folded-under portions of said bumper strips at opposite ends, each runner having a longitudinal groove extending along its lower surface; and a corresponding plurality of metal straps around said package, each said band passing through and held in the groove of one said runner and lying against said bumper strips, forming a self-palletized package.

11. A shipping package for cartons, comprising two substantially identical stacks of K.D.F. corrugated paper cartons, said stacks being disposed side by side against each other, each carton therein lying on end in a generally vertical plane, with the ends of the stacks generally coplanar, said stacks being under pressure of between 4 and 15 p.s.i.; a pair of oversize corrugated paper locking sheets covering the two opposite vertical ends of said stacks and joining said stacks together, each locking sheet lying mainly in a plane parallel to those of said cartons and having marginal portions of substantial width folded back horizontally on marginal portions of the top and bottom of said stacks; four long narrow bumper strips of corrugated paper extending generally vertically and parallel to and spaced apart from each other outside and against each locking sheet, symmetrically located with respect to the package, and with end portions folded respectively over the top and under the bottom of the package and respectively overlying and underlying said locking sheet folded-back portions; two rabbeted runners on the bottom of said package, one beneath each said stack, parallel to each other, each extending between and beneath the folded-under portions of said bumper strips at opposite ends, the rabbet in each runner being in the lower surface thereof; and a pair of metal bands around said package, one around each said stack, each said band lying in the rabbet of one said runner and lying against said bumper strips, forming a self-palletized package with the two runners held thereto only by said bands and the two stacks held together only by said locking sheets and by said locking sheets being held to said stacks by said bands.

12. A plural-layer shipping unit for cartons, the first layer comprising a first bale of two substantially identical stacks of K.D.F. corrugated paper cartons and the other layers each comprising second and third bales of stacks substantially identical to the stacks of said first bale, said stacks in said first bale being disposed side by side and snugly against each other, each carton in each said bale lying on end and in a generally vertical plane, with the ends of all said stacks generally coplanar; a pair of oversize corrugated paper locking sheets in said first bale only, each covering one end of both said first-bale stacks and joining said stacks together, each locking sheet having marginal portions thereof folded back horizontally on marginal portions of the top and bottom of said first bale; four long narrow bumper strips of corrugated paper extending generally vertically and parallel to and spaced apart from each other outside and against each locking sheet, symmetric with respect to said first bale, and with end portions folded respectively over the top and under the bottom of said first bale and respectively overlying and underlying said locking sheet folded-back portions;

two rabbeted runners on the bottom of said first bale, one beneath each said stack, with its rabbets open downwardly, said runners being parallel to each other and extending between and beneath folded-under portions of said bumper strips; a pair of metal straps around said first bale, one around each said first-bale stack, each said band lying in the rabbet of one said runner and lying against said bumper strips, forming said first bale into a self-palletized package; each of said second and third bales comprising a stack with a pair of bumper strips, one at each end extending vertically at about the center-line of said stack, and a single strap encompassing said bale, the cartons therein having their edges protected by said bumper strips, and the end cartons having their faces protected by said bumper strips; said second and third bales lying side by side on top of said first bale to comprise a palletized unit for shipping, loading and storing.

13. A shipping package for cartons, comprising a pair of stacks of K.D.F. corrugated paper cartons side by side lying vertically on edge; two pairs of corrugated paper locking sheets, each comprising L-shaped members extending the full width across both pairs of stacks along the two common upper and lower edges with two said members at the opposite upper edges, each with a horizontal flange overlying the upper part of said stack and two at the opposite lower edges, each with a

horizontal flange underlying the bottom of said stack, each of said L-shaped strips having vertical flanges overlying portions of the opposite common faces of said stacks; a plurality of rabbeted runners on the bottom of said package supporting said package with the rabbets on the lower surfaces thereof, said runners being spaced apart parallel to each other, each extending between and beneath the pair of horizontal flanges of the members lying along said lower edges; and a corresponding plurality of metal bands around said package, each said band lying in the rabbet of one said runner and passing around said locking sheets, each locking sheet lying inside said band, whereby said package is self-palletized.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,895,608 July 21, 1959

Harry W. Wilson

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 39, for "maintain" read -- maintaining --; column 6, line 9, for "condition" read -- operation --.

Signed and sealed this 22nd day of March 1960.

(SEAL)
Attest:

KARL H. AXLINE
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ROBERT C. WATSON
Commissioner of Patents