Sept. 2, 1969 D. T. MARTIN 3,464,370

PAPERBOARD PALLETS

Filed May 8, 1968 2 Sheets-Sheet 1

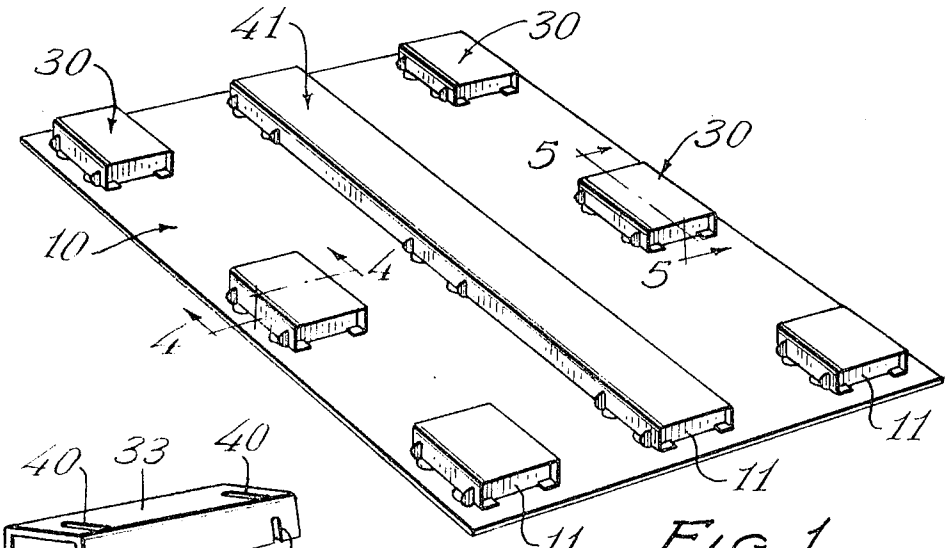

FIG. 1

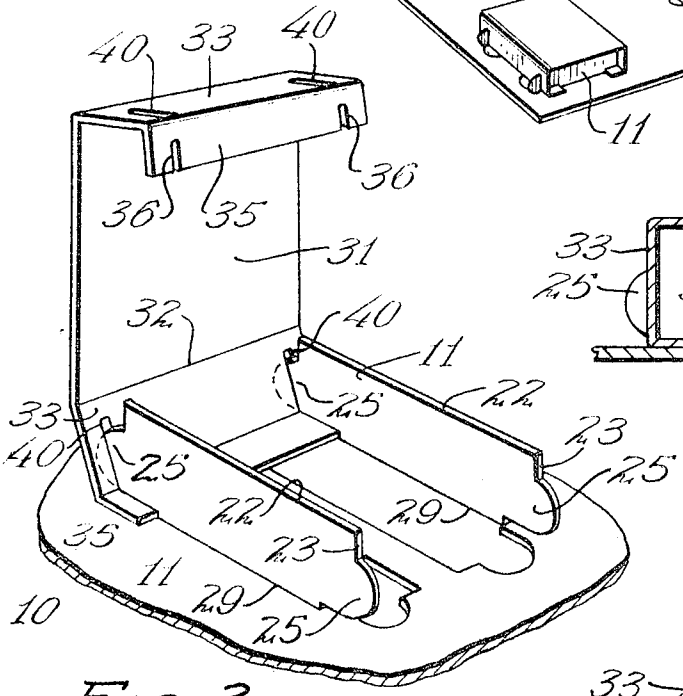

FIG. 3

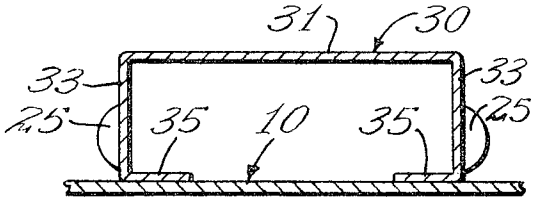

FIG. 4

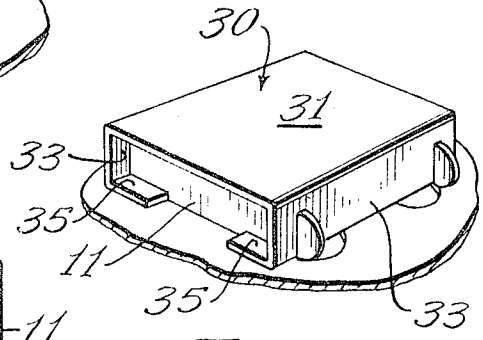

FIG. 2

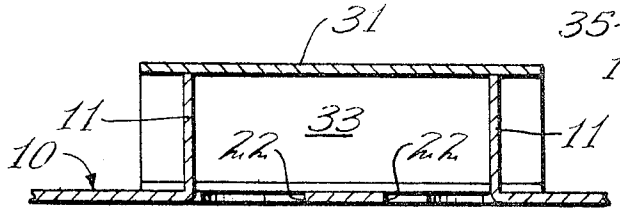

FIG. 5

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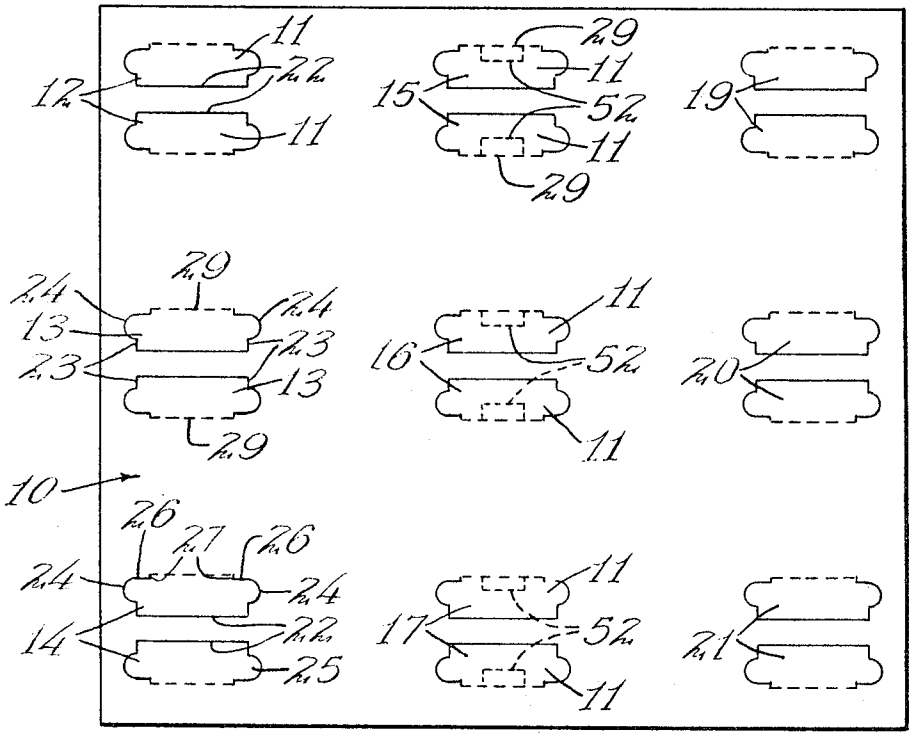

FIG. 6

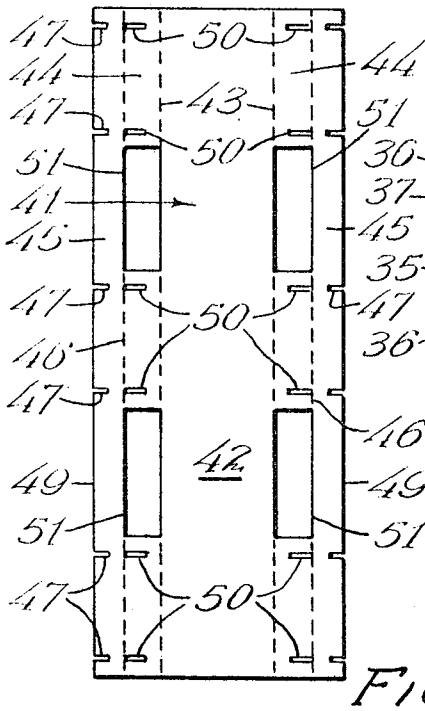

FIG. 8

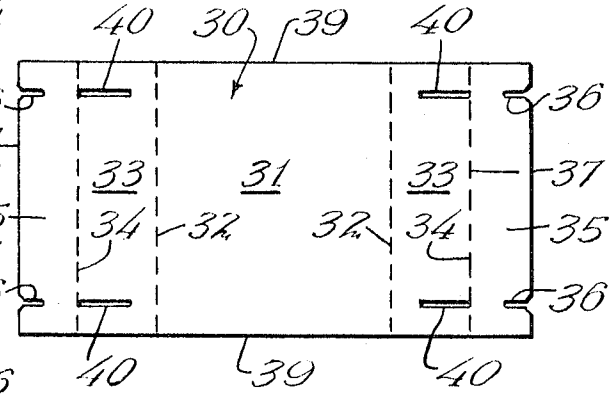

FIG. 7

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3,464,370

PAPERBOARD PALLETS

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Int. Cl. B65d *19/34, 19/12, 19/16*
U.S. Cl. 108—56 10 Claims

ABSTRACT OF THE DISCLOSURE

A pallet is disclosed which may be produced at low cost. It comprises a platform panel having pairs of leg-forming flaps hinged thereto, the flaps of each pair being hinged along parallel fold lines. The flaps of each pair are folded into parallel spaced relation at right angles to the platform. A leg-forming blank is wrapped around the flaps. Each blank includes a bottom panel, side wall panels secured to opposite sides of said bottom panel, and bearing flanges hinged to the side wall panels. The bottom panel underlies the pair of flaps, the side walls extend over the sides of the flaps and interlock therewith, and the bearing flanges are in face contact with the under surface of the platform panel and interlock the sides of said flaps. A plurality of leg-forming blanks may be combined if desired. The pallet may be impregnated with a stiffening material if desired.

This invention relates to an improvement in pallets and deals particularly with a pallet formed of cut paperboard or similar inexpensive material.

Numerous forms of pallets have been produced for supporting unitary loads. Most of these pallets were originally made of wood or metal. However, with the increase of cost of these products, and the increase in cost of labor in making the pallets, disposable pallets made of paperboard were produced. Many such pallets are formed by winding single faced corrugated paperboard about a mandrel to form thick walled paperboard tubes, and sawing the tubes into sections of equal length to provide legs which may be glued to the under surface of a sheet of corrugated paperboard or the like, or glued between two parallel sheets of such material to form a pallet which may be discarded after use. Such disposable pallets are particularly desirable where pallet loads are being shipped considerable distances and where it is often impractical to ship the pallets back to the original manufacturer.

Other pallets have been produced by forming reinforced paperboard box-line legs and securing them to the pallet either by adhesive or by locking the legs to the pallet sheet by the use of suitable locking flaps. While many such structures are capable of withstanding necessary compressive force, and often may be produced at a low cost for the materials, the cost of assembling the pallets and attaching the legs to the pallet platform is often quite high. It is an object of the present invention to provide a pallet construction which may be produced at low material cost, and which may be quickly and easily assembled.

During recent years a plastic composition has been produced which may be absorbed into paperboard while in a liquid state, and which when cured or set, greatly increase the strength and rigidity of the paperboard. Such materials also act to adhere contacting portions of the paperboard together so that the resulting structure is extremely hard and durable. By producing an inexpensive pallet of corrugated paperboard or fiberboard, and then impregnating the assembled pallet with a plastic material

of this type, an extremely strong rigid pallet is provided which may be produced at a cost considerably less than the cost of producing a wooden pallet of the same size, but yet which is substantially as durable as most conventional wooden pallets, and which is much lighter in weight.

A feature of the present invention resides in the provision of a pallet including a platform sheet which is die cut to provide pairs of flaps or flanges which may be folded in to right angular parallel relation to the remainder of the platform panel. A leg forming strip is cut and creased to fold about the free edges of these angularly extending flanges so as to form a rectangular box secured to the pallet panel and to enclose the side and bottom edges of the flaps or flanges. While the pallet may be used while in this form, the strength of the pallet may be greatly increased in impregnating the paperboard with a plastic material which adheres the contacting parts together and rigidifies the paperboard so that it is capable of withstanding much greater loads.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification.

FIGURE 1 is a perspective view of the pallet in inverted position.

FIGURE 2 is a perspective view of one of the legs of the pallet in assembled form.

FIGURE 3 is a perspective view similar to FIGURE 2 but showing the leg in partially formed position.

FIGURE 4 is a sectional view through one of the legs, the position of the section being indicated by the line 4—4 of FIGURE 1.

FIGURE 5 is a sectional view at right angles to FIGURE 4, the position of the section being indicated by the line 5—5 of FIGURE 1.

FIGURE 6 is a diagrammatic view of the blank from which the platform panel is formed.

FIGURE 7 is a diagrammatic view of the blank from which one of the individual legs is formed.

FIGURE 8 is a diagrammatic view of the blank from which a multiple leg is formed.

It will be understood that pallets differ depending upon the size of the pallet. The size of the pallet is normally determined by the size of the product being palletized. Smaller pallets may be supported by four legs located near the corners of the pallet platform. Larger pallets are often supported by nine supporting legs, the legs being arranged in three spaced parallel rows. This structure is provided so that the forks of a lift truck used to lift the panel may be inserted either from the front or from the side of the pallet, the forks of the lift truck extending on opposite side of the center row of legs in either case.

The pallet illustrated in the drawings is designed to have the equivalent of nine legs. However, the center row of three legs is formed by a single elongated leg, portions of the elongated multiple leg being apertured for the accommodation of the forks of a lift truck.

The pallet platform is indicated in general by the numeral **10**. The platform **10** is preferably rectangular in outline and is shown as including nine pairs of parallel flaps **11**, the pairs of flaps in one row being indicated at **12**, **13**, and **14**, the flaps of the third row being indicated at **19**, **20**, and **21**. In view of the fact that the flaps **11** are all of identical form, only a single flap structure will be described in detail.

The flaps, such as **11**, are generally rectangular in outline, and are connected to the remainder of the platform **10** along lines of fold which are shorter than the width of the flaps so that the ends of the leg forming blank may

be inserted between the side edges of the flaps and the under surface of the panel **10**. The ends of the flaps which will be lower edges of the flaps when the legs are formed are defined by cut lines **22**. At opposite ends of the cut lines **22**, right angular cut lines **23** are provided at their ends with right angularly extending cut lines **23** which in turn communicate with semicircular cut lines **24** which provide laterally extending ears at the ends of the flaps. Cut lines **26** extend in alignment from the upper ends of the semicircular cut lines **24**, the cut lines **26** being parallel to the lower free edges **22** of the flaps. The inner opposed ends of the cut lines **26**, which are of equal length, are connected by short right angularly extending cut lines **27** to the ends of a fold line **29**. The fold lines connecting all of the flaps **11** to the platform panel **10** are paralleled. Accordingly, the flaps **11** can be folded out of the plane of the platform panel **10** and into spaced parallel right angular relation as indicated in FIGURE 3 of the drawings.

The blank used for forming a single leg is indicated in general by the numeral **30** and is illustrated in FIGURE 7 of the drawings. The blank **30** is generally of rectangular form and includes a rectangular bottom panel **31** which is located centrally of the blank and which is connected by parallel fold lines **32** to leg side walls **33**. The side walls **33** are foldably connected by the fold lines **34** to bearing flanges **35**. The fold lines **34** are parallel to the previously described fold lines **32** so that the leg **30** may fold into generally channel-shaped form with the bearing flanges **35** folded inwardly into a common plane.

Slots **36** are provided in spaced parallel relation extending into the end edges **37** of the blank parallel to the parallel side **39** of the blank. Elongated slots or apertures **40** are provided in the side walls **33**. The slots **40** are aligned with the slots **36** and extend from the fold line **34** toward the fold lines **32** but terminated short thereof. The slots **40** are of a length substantially equal to the diameter of the semicircular projections **25** of the flaps **11**. The slots **36** and **40** are spaced apart a distance substantially equal to the distance between the fold lines **29** connecting the flaps **11** of each pair to the platform panel **10**.

As indicated in FIGURE 3, each leg is formed by bending the flaps **11** into right angular relation to the platform panel **10**, and interengaging the slots **36** at one end of the blank **30** with the upper edges **26** of the flaps adjacent their hinge to their hinge lines **29**. The bearing flange **35** is in face contact with the under surface of the panel **10**. The side wall **33** joining the engaged flange **35** is then folded upwardly as indicated in FIGURE 3, the rounded projections **35** engaging through the slots **40** as illustrated.

The bottom panel **31** is then folded down toward the end surfaces **22** of the flaps **11**, the side wall **33** is folded into angular relation to the bottom panel **31**, and the bearing flange **35** is folded into angular relation to the side wall **33**. In other words, the leg forming blank is folded into substantially the position illustrated in FIGURE 3 as the bottom panel **31** is swung toward the flap edges **22**. The bearing flange **35** is folded against the under surface of the platform panel **10**, and the bearing flange is forced beneath the ears **25** and beneath the end edges of the flaps **11**, the slots **36** interlocking with the sides of the flaps **11**, and the ears **25** extending through the slots **40**. The leg unit is then complete, and appears as indicated in FIGURE 2 of the drawings.

All of the legs may be made in the manner described using the leg forming blank **30**. As previously described, there will then be nine such legs attached to the platform panel **10**. However, an alternate structure is indicated in FIGURE 8 of the drawings which comprises, in effect, a multiple leg unit. One such multiple leg unit is indicated in FIGURE 1 of the drawings but it will be understood that three of such multiple leg units may be attached in parallel relation to the platform **10** if it is preferred. In view of the fact that the blanks **30** and **41** function in much the same manner, either structure may be employed.

It will be understood that if jigs are used to hold the flaps in right angular relation to the platform **10** while the leg forming blanks are wrapped about the flaps, a multiple leg unit **41** may be easily applied to the flaps. However, if the flaps **11** are held in position manually during the attachment of the leg forming blanks, it may be quicker and simpler to use nine individual leg forming blanks **30** than to apply three multiple leg-forming blanks **41**.

As indicated in FIGURE 8 of the drawings, the leg forming blank **41** includes an elongated bottom panel **42** having attached thereto along parallel fold lines **43** a pair of side walls **44**. Bearing flanges **45** are hingedly connected to the side walls **44** along parallel fold lines **46**. Each bearing flange **45** is provided with three pairs of slots **47** extending into the outer edges **49** of the blank. The slots **47** of each pair being spaced apart a distance equal to the spacing between the pairs of flaps. In other words, the slots **47** at one end of the bearing flanges **45** are spaced from the next pair a distance equal to the spacing between the end pair of flaps **15** and the intermediate pair of flaps **16**, and the intermediate pair of slots **47** is spaced from the other end pair of slots **47** a distance equal to the spacing between the pair of flaps **16** and the pair of flaps **17**. Elongated slots or apertures **50** are provided in the side walls **44** in alignment with the slots **47**. The slots **50** are arranged similarly to the slots **40** and are designed to accommodate the locking ears **25** of the flaps **11**.

Each side wall **44** is divided into three sections of equal width by two pairs of apertures **51**. The apertures **51** are rectangular and extend the full width of the side walls between the fold lines **43** and **46**. The three remaining portions of the side wall **44** are substantially equal in width to the side walls **33** of the individual leg forming blanks **30**. As a result, the structure shown in FIGURE 8 of the drawings is actually the equivalent of three individual leg-forming units **30** which are connected by intermediate portions of the bottom panel **42** and intermediate portions of the bearing flanges **45**.

In attaching the leg forming blank **41**, one row of leg-forming flaps such as indicated at **15**, **16** and **17** are folded into right angular relation to the platform panel **10**, and are preferably held in this position by suitable means while the blank **41** is applied. For example, the platform **10** may be inserted over a table having pairs of upwardly extending lugs which engage the various flaps **11** closely adjacent the fold lines **29** and hold the flaps at right angles to the platform **10**. Six such lugs are indicated at **52** beneath the blank in FIGURE 6 of the drawings.

With the flaps **11** of each pair supported in parallel relation at right angles to the platform **10**, one bearing flange **46** is interlocked with one edge of the flaps, the slots **47** accommodating portions of the flaps **11**. The adjoining side wall is folded upwardly; the ears **25** extending through the slots **50**. The bottom panel **41** is folded down to overlie the edges **22** of the flaps **11**, the other side wall **44** is folded about the opposite end of the flaps **11**, and the adjacent bearing flange **49** is inserted beneath the opposite side of each of the flaps, and the slots **47** are interlocked with portions of the sides of the flaps **11**.

The assembled pallet is preferably impregnated with a solution which will stiffen and rigidify the corrugated paperboard, and which will normally hold the pallet from disassembly. For example, a melamine resin solution or urea-formaldehyde solution may be used. Similarly, a silicone or sulphur solution may be used to accomplish the purpose. When treated in this manner, the pallet becomes very durable, and normally may be reused if desired. At the same time, the pallet is relatively low in cost and light in weight.

If desired, a second platform sheet may be used, be secured to the lower ends of the legs, or paperboard strips may be adhered to the legs of each row of individual legs. However, the pallet functions very effectively without this additional platform sheet.

In accordance with the patent statutes, I have described the principles of construction and operation of my paperboard pallets; and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made without departing from the spirit of my invention.

I claim:

1. A pallet comprising:
a platform panel of paperboard or the like,
a series of pairs of singular flaps hingedly connected to said panel, the flaps of each pair being folded along parallel fold lines into right angular relation to said panel, and
a leg-forming blank including a bottom panel underlying the end edges of said flaps, side walls extending upwardly along the sides of said flaps, and bearing flanges in face contact with the under surface of said panel.

2. The structure of claim 1 and including interlocking means on the sides of said flaps and said side walls.

3. The structure of claim 1 including laterally projecting ears on said flaps, said side walls including apertures through which said ears extend.

4. The structure of claim 3 and in which said bearing flanges include slots into which portions of said flaps extend.

5. The structure of claim 1 and in which said bearing flanges include slots into which portions of said flaps extend.

6. The structure of claim 1 and in which said leg forming blank extends about a plurality of pairs of parallel flaps.

7. The structure of claim 5 and in which said side walls are apertured between said pairs of flaps to accommodate the forks of a lift truck.

8. A pallet comprising:
a platform panel of paperboard,

a series of pairs of similar flaps hingedly connected to said panel and folded into parallel spaced relation,
said flaps being generally rectangular in form including end flaps to said panel and side edges including projecting ears,
lines of fold hingedly connecting said flaps to said panel, said lines of fold terminating short of said side edges and connected thereto by cut lines forming upper edge portions on said flaps adjoining the ends thereof.
a leg-forming blank creased along parallel fold lines to provide a bottom panel, side walls hinged to opposite edges of said bottom panel and bearing flanges hinged to the upper edges of said side walls and extending between said upper edge portions of said flaps and said panel,
said side walls being apertured to accommodate said projecting ears extending therethrough,
said leg-forming blank enclosing the edges of at least one pair of flaps,
there being sufficient such leg-forming blanks to enclose the marginal edges of all of said pairs of flaps.

9. The structure of claim 8 and in which one said leg forming blank is provided for each pair of flaps.

10. The structure of claim 8 and in which one leg-forming blank encloses the edges of a plurality or pairs of said flaps.

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