June 4, 1963 L. DAVIDSON 3,092,046

PALLET FOR INDUSTRY

Original Filed Nov. 28, 1956

Fig. 1

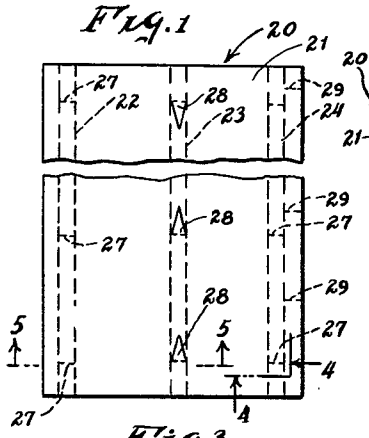


Fig. 2

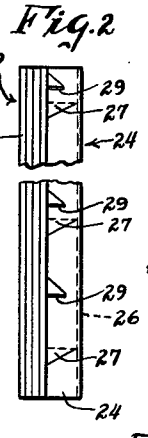


Fig. 4

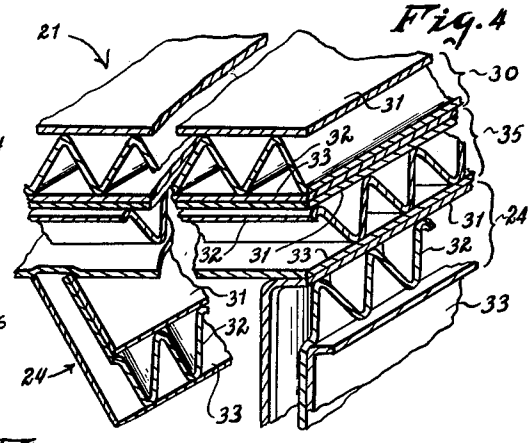


Fig. 3

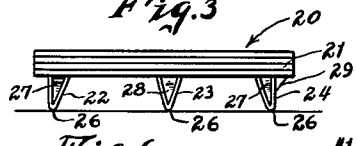


Fig. 5

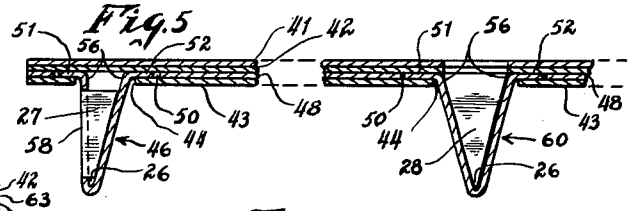


Fig. 6

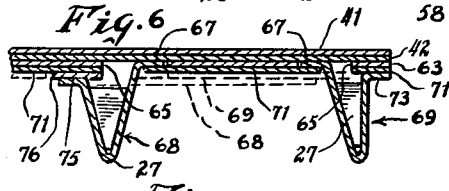


Fig. 7

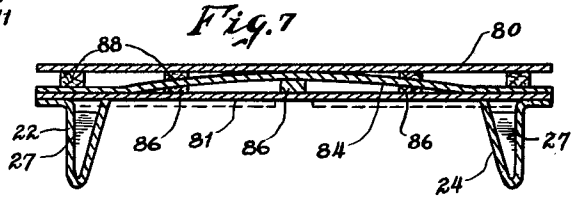


Fig. 8

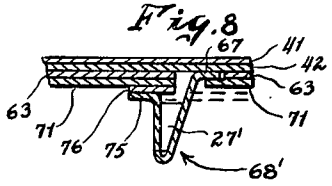


Fig. 10

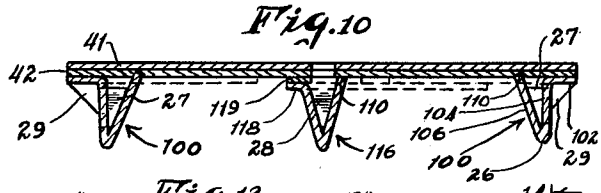


Fig. 9

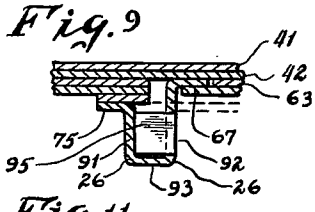


Fig. 13

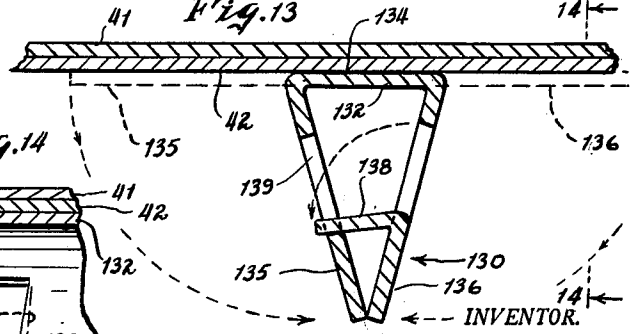


Fig. 11

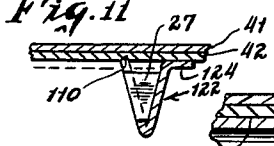


Fig. 14

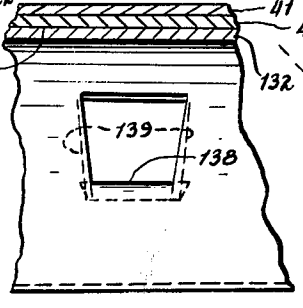
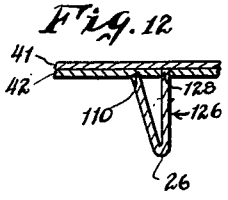


Fig. 12



INVENTOR.

Louis Davidson

BY Emery, Whittemore, Saunders & Dix.

ATTORNEYS

United States Patent Office

3,092,046

Patented June 4, 1963

3,092,046

PALLET FOR INDUSTRY

Louis Davidson, 24 Waterview Road, Oceanside, N.Y.

Continuation of application Ser. No. 624,882, Nov. 28, 1956. This application Jan. 26, 1960, Ser. No. 4,673

8 Claims. (Cl. 108—56)

This invention relates to pallets on which goods are stored for convenient pickup by industrial tractors having fork or platform hoists projecting from their front ends, or to keep merchandise above floor. Such pallets are used for stacks of paper, empty cartons, cartons with merchandise, and where the cartons can be stacked, and various other goods.

When goods are shipped from a factory on pallets, it is desirable to leave the pallet at the customer's warehouse for subsequent handling by the customer. Expense and inconvenience are involved in the return of pallets to the factory and it is desirable to have pallets which are inexpensive so that they need not be returned. It is an object of this invention to provide a pallet which can be constructed of corrugated paper board, or of plastic; fibre board; metal; or a combination of these. This reduces both the cost and the weight, as compared with conventional wooden pallets, and it is a feature of the invention that the pallets of this invention can be folded into a flat condition when they are being shipped in quantity, or stored.

It is another object of the invention to provide a flat pallet having legs which can be brought into operative position quickly and without the use of tools. Other features of the invention relate to constructions which make the pallets economical to manufacture by automatic machinery, and which provide the pallets with high strength when in their set up positions ready to receive a load.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

This application is a continuation of my co-pending, allowed application, Serial No. 624,882, filed November 28, 1956, now abandoned.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is a top plan view of a pallet made in accordance with this invention;

FIGURES 2 and 3 are side and end elevations, respectively, of the pallet shown in FIGURE 1;

FIGURE 4 is a greatly enlarged sectional view taken along the broken line 4—4 of FIGURE 1;

FIGURE 5 is a fragmentary, transverse sectional view through a portion of the pallets and two of the legs but showing a modified construction from that shown in FIGURES 1–4;

FIGURE 6 is another fragmentary, transverse sectional view showing another modified form of the invention;

FIGURE 7 is an end view of another modified form of pallet having only two legs and having an arch construction for stiffening the platform of the pallet;

FIGURES 8 and 9 are detail sectional views showing other modified constructions for the legs;

FIGURE 10 is a transverse sectional view showing still other modifications of the leg structure;

FIGURES 11 and 12 are detail sectional views showing some additional ways by which the legs are held in position after being bent into operative position;

FIGURE 13 is another detail sectional view showing another modified leg construction; and

FIGURE 14 is a sectional view taken on the line 14—14 of FIGURE 13.

FIGURE 1 shows a pallet 20 having a platform 21 and having legs 22, 23 and 24 extending downwardly from the underside of the platform. Each of the legs 22–24 is made by folding corrugated paper board along score lines 26 to provide a V cross section and the panels which are folded into this cross section are braced internally by tabs 27 and 28 struck from the sides of the legs and from the platform, respectively.

These tabs 27 and 28 are of generally triangular shape corresponding to the cross section of the inside of the legs 22, 23 and 24, and they are severed from the leg or platform structure along two sides while being merely scored along the other side to provide a hinge about which the tabs are swung into operative position when setting up the pallet. Other tabs 29 may be displaced from a side panel of one or more of the legs for bracing the leg against folding outwardly. In FIGURES 1–3, there are tabs 29 on the leg 24, though they can be used on other legs. All of the tabs will be more fully explained in connection with the sectional views.

The platform 21 may be made from a single thickness of corrugated paper board, or from plastic, fibre board or several layers of board. When made with only one thickness of paper board, the corrugations preferably extend transversely of the legs 22–24. When made with several layers of corrugated paper board connected together, each successive layer may have its corrugations extend in the same direction as the other corrugations or at right angles to the corrugations of the layer of paper board below. When the platform 21 is made with several layers, and tabs 28 are struck from the platform, the tabs are cut through along all sides in all layers except the bottom layer. Thus, only the bottom layer provides a hinge.

FIGURE 4 shows the platform 21 with an upper layer 30 having a top sheet 31 of paper attached to a corrugated layer of paper 32 which is in turn attached to a bottom sheet 33. This is a conventional construction well understood in the art. The platform has a lower layer 35 made up of two sheets of paper 31 and 33 secured to an intervening layer of corrugated paper 32. In the construction illustrated, the corrugations 32 of the successive layers 30 and 35 extend at right angles to one another. If two-ply corrugated board, with the corrugations all running in the same direction is used, there is only one flat sheet between the corrugated layers.

FIGURE 4 also shows the leg 24 in section. The manner in which the leg is attached to the platform 21 will be explained in connection with other views. For the present, it is sufficient to understand that the leg 24 is made up of the same kind of corrugated paper board with sheets 31 and 33 attached to an intervening corrugated layer of paper 32, and that the corrugations in the leg extend in a vertical direction when the leg is in operative position.

All of the constructions shown in FIGURES 5–14 may be made with corrugated paper board such as shown in FIGURE 4, or with equivalent paper board constructions; but for clearer illustration on a smaller scale, no attempt is made to show individual layers of corrugated board if such is used. Some features of the invention, especially the construction of the legs from sheet material with

the reinforcing tabs struck from the panels of the legs, can be used with other than corrugated sheet material.

FIGURE 5 shows one construction in which the pallet has a platform comprising an upper layer 41 and an underlying layer 42. There is a bottom layer 43 of the paliet platform with slots 44 extending lengthwise of the pallet for receiving the upper ends of legs 46. The bottom layer 43 is held in spaced relation to the layer 42 by a shim layer 48. The different portions of the shim layer 48 are spaced from one another to leave a slot 50 the slots 44 and 50 form downwardly-facing channels or grooves in the bottom of the pallet; and each of the slots 50 is made substantially wider than the adjacent slot 44 so that there are side channels or undercuts on both sides of the downwardly facing groove for receiving edge panels 51 and 52 at the upper ends of the legs 46.

In the construction shown in FIGURE 5, the leg 46 is originally a separate piece from the pallet platform. When setting up the pallet, the leg 46, originally supplied in a flat condition, is bent along a center score line 26 and then it is bent along other score lines 56 to provide the outwardly extending edge panels 51 and 52.

In order to insert the panels 51 and 52 into the side channels or undercuts provided by the excess width of the slot 50, the upwardly extending sides of the legs 46 are brought close together so that the edge panels 51 and 52 can pass upwardly through the slot 44, and the vertical portions of the leg 46 are then separated toward their upper ends to force the edge panels 51 and 52 into the side channels, above the layer 43 and on opposite sides of the slot 44. In order to prevent the sides of the leg 46 from coming together again, the tab 27 is folded inwardly, as shown in FIGURE 5. The tab 27 is originally flush with the rest of the panel from which the leg 46 is made and they are severed from the panel, at the time of manufacture, along all except a scored side line 58 which provides a hinge for swinging the tab 27 inwardly.

FIGURE 5 shows another leg 60 of the same construction as the leg 46 except that the cross section of the leg 60 is a substantially isosceles triangle whereas the cross section of the leg 46 is a substantially right triangle.

FIGURE 6 shows a modified construction in which the legs of the pallet are made from panels permanently attached to the platform of the pallet. In FIGURE 6 the platform has an upper layer 41 and an underlying layer 42. These two layers 41 and 42 are preferably continuous across the entire area of the pallet. A third layer 63 has slots 65 extending lengthwise of the pallet for providing side channels into which edge panels 67 extend when legs 68 and 69 are in operative position.

There is a bottom layer 71, in the construction of FIGURE 6, extending under a substantial portion of each of the slots 65 so as to hold the edge panels 67 of the legs against downward movement after the edge panels have been inserted through slots in the bottom layer 71 and thrust into the space between the bottom layer 71 and the confronting surface of the layer 42.

The leg 69 has an edge panel 73 attached to the bottom layer 71 by adhesive, or by stapling, or in any other suitable manner. This is a permanent connection of the leg 69 to the platform of the pallet; and when originally manufactured, the leg 69 lies flat along the bottom surface of the bottom layer 71, as shown in dotted lines in FIGURE 6.

The leg 68 is permanently attached to the platform of the pallet by an edge panel 75, but in order to have an originally flat construction, there is a spacer 76 between the edge panel 75 and the bottom layer 71 of the pallet platform. This spacer 76 is of the same thickness as the material of the leg 69. When originally manufactured, the leg 68 lies flat against the spacer 76 and the leg 69, as shown in dotted lines.

After the legs 68 and 69 have been folded along their score lines and assembled with the platform of the pallet in the positions shown in FIGURE 6, the legs are held in their extended positions by bending inwardly tabs 27 in the manner already described in connection with FIGURE 5.

For use with lift trucks having lifting forks, it is usual to provide three legs for supporting a pallet; but for lift trucks having platforms instead of forks, it is necessary to omit the middle leg of the pallet.

FIGURE 7 shows a modified construction having only two legs, and having the pallet platform constructed in a way that increases its stiffness. In FIGURE 7, the pallet platform has an upper layer 80 and a bottom layer 81. These layers are parallel to one another, but spaced some distance apart to provide clearance for an intermediate arched layer 84. This arched layer is secured to the bottom layer 81 over substantial areas of contact on both sides of the pallet, but it is spaced from the bottom layer by spacing means 86 extending lengthwise of the pallet. The spacing means 86 may be a continuous strip or it may consist of a row of blocks spaced from one another. The layers 80 and 81 are held in spaced relation at a number of different locations by spacing means 88 which may be continuous strips extending lengthwise of the pallet, or rows of blocks, as in the case of the spacing means 86.

FIGURE 8 shows a construction similar to FIGURE 6 but with the cross section of the leg substantially a right triangle. Parts which are the same as in FIGURE 6 are indicated by the same reference characters; and parts which correspond, though of different shape, are indicated by the same reference character with a prime appended.

FIGURE 9 shows a construction similar to FIGURE 8 but with the leg of rectangular cross section instead of triangular. In this construction shown in FIGURE 9, the edge panels of the leg are indicated by the same reference characters as in FIGURE 8, but the lower portion of the leg includes two downwardly extending panels 91 and 92 connected at their lower ends by an intermediate panel 93. As in the other constructions, the panels 91 and 92 are originally flat, and in line with the intermediate panel 93, and they join the panel 93 along score lines 26. The leg shown in FIGURE 9 is held in expanded position by tabs 95 struck out of the side panel 91 or 92, or from both side panels. This leg of rectangular cross section is not as rigid as those of triangular cross section, but it provides a larger area of contact with the floor and wears less if the pallet is to be given continuous use.

FIGURE 10 shows another modified construction in which the legs are permanently connected to the pallet platform but held in extended position in a somewhat different way than in the other constructions. The platform in FIGURE 10 includes a top layer 41 and a second layer 42. A leg 100 has an edge panel 102 permanently secured to the layer 42 of the platform by adhesive, stapling, or other means, as previously described. The leg 100 has a downwardly extending panel 104 joined at its upper end to the edge panel 102 along a score line, and joined at its bottom edge to another upstanding panel 106 along a score line 26.

Instead of having an edge panel at the upper end of the upwardly extending leg panel 106, the upper edge of this panel 106 is set into a depression 110, formed in the bottom surface of the platform layer 42. This depression 110 preferably extends for the full length of the pallet platform and is made by applying a distorting pressure against the bottom surface of the layer 42 during the manufacture of the pallet. The leg 100 is held in expanded position by a tab 27 struck from the leg 100.

The leg 100, shown in FIGURE 10, has an additional feature for increasing its rigidity. This feature includes

a bracing tab **29** struck from the leg **104** and movable into a position to serve as a gusset between the leg **104** and the edge panel **102**. This gusset bracing can also be used with the legs shown in the other views where the angle between the leg and the top edge panel permits a gusset or bracing tab to be struck from an upstanding panel of the leg.

FIGURE 10 also shows a leg **116** attached to the pallet platform by an edge panel **118** and spacer **119**. This leg **116** has its free edge held in place by setting into a depression **110**, as already described in connection with the leg **100**. The leg **116** is held in its extended position by a triangular tab **28** struck from the platform layers **41** and **42** and hinged downwardly into the interior of the leg **116**.

FIGURE 11 shows a leg **122** similar to the leg **100** of FIGURE 10 except that it has a substantially triangular cross section and has no gusset or bracing tab. This leg **122** has an edge panel **124** permanently secured to the platform panels **41** and **42**, and it has its free edge set into a depression **110** in the bottom of the platform.

FIGURE 12 shows another construction in which a leg **126** is attached to the platform of the pallet without the use of adhesive means. The leg **126** is originally supplied as a flat panel, separated from the pallet platform, and after folding along the score line **26**, one panel of the leg **26** is inserted into a channel **128**, and the other side of the leg is set into a depression **110**. There may be no permanent connection between the leg **126** and the platform of the pallet, friction in the channel **128** being relied upon to hold the leg. This is the simplest leg construction shown in any of the figures of the drawing. Adhesive can be added, if desired.

FIGURE 13 shows a construction in which a leg **130** is made from a strip having a center panel **132** secured to the pallet layer **42** by adhesive **134**, or staples, or any other permanent fastening means. Side panels **135** and **136** are connected to the center panel **132** along score lines which permit the panels **135** and **136** to be bent downwardly from the original flat, dotted line positions to the full line positions shown in FIGURE 13. Thus, the side panels **135** and **136** form a leg of triangular cross section. These panels **135** and **136** can be connected together at their lower ends by staples or other fastening means but are preferably connected together by striking a tab **138** from the panel **136**. This tab **138** swings inwardly and engages the edges of a slot **139** cut in the panel **135**. The tab **138** has edges that diverge toward the upper end of the tab and these engage edges of the slot **139**, which preferably coverage toward their lower edge. The tab **138** and the slot **139** are preferably of similar shape so that corresponding dies can be used on the machine by which the leg of FIGURE 13 is manufactured. FIGURE 14 shows the structure of FIGURE 13 viewed from the line **14—14** of FIGURE 13.

The preferred embodiment and a number of modifications of the invention have been illustrated and described, but changes and other modifications can be made and some features can be used in different combination without departing from the invention as defined in the claims.

What is claimed is:

1. A load-supporting pallet including a platform having a top part and at least one lower layer and made up of distinct planar sheets of material, legs spaced from one another transversely of the platform for supporting the platform from an underlying surface, the legs including hollow ridges formed of sheet material, each leg having panels connected together along a scoreline, and the panels having upper portions adjacent to the bottom of the platform, at least two panels of each leg extending downwardly away from the bottom of the platform when the leg is in operative position, the leg being of substantial fore-and-aft extent, means connecting each of the legs to the platform along an upper portion of one panel, grooves in the bottom of the platform and each of which is formed by displacement of material from the platform including the lower layer thereof, each groove opening downwardly and having the upper portion of the other panel extending into it, said upper portion of the other panel, being held by a side of the groove against lateral displacement in at least one direction, said lower layer extending intermediate the legs and across the lower side of the top part of the platform for substantially the full width of the transverse spacing of the legs and being attached to the top part at least in the center region of the transverse spacing between the legs and bracing the top part against bending at said center region between the legs where bending moment is a maximum, the opposite side edges of said lower layer intermediate the legs constituting sides of successive grooves.

2. The load-supporting pallet described in claim 1, and in which said sheet material is corrugated sheet material and the legs extend for most of the length of the platform.

3. The load-supporting pallet described in claim 1, and in which there are tabs displaced from the material of certain portions of the pallet but still connected to said portions of the pallet along score lines that hinge the tabs to the pallet along one side of each tab, the tabs being of an outline that fits the hollow interior of the legs, and the different tabs being oriented to swing into position where they extend across the full inside cross section of the leg to brace the downwardly extending panels of the leg against bending inwardly when the pallet is loaded.

4. The load-supporting pallet described in claim 1 and in which there are tabs displaced from the material of certain portions of the pallet but still connected to said portions of the pallet along score lines that hinge the tabs to the pallet along one side of each tab, the tabs being of an outline that fits into the hollow interior of the legs, and the different tabs being oriented to swing into positions where they extend across the full width of the inside cross section of the leg along at least a portion of the height of the leg to brace the downwardly extending panels of the leg against bending inwardly when the pallet is loaded.

5. The load supporting pallet described in claim 1 and in which the platform has at least three layers and the two lower layers provide a groove for receiving said other top portion of each leg, the bottom one of the two lower layers being of greater transverse width than the layer immediately above it to provide an undercut on the side of the groove, and said other top portion of the leg including a panel that fits into the groove and into the undercut and that extends parallel to the bottom of the platform when the leg is in operative position.

6. The load supporting pallet described in claim 1 and in which the platform has three layers, and a leg of the pallet has panels along both of the top portions of the leg extending parallel to the bottom of the pallet when the leg is in operative position, and there is an undercut on both sides of the groove formed by extensions of the bottom layer beyond part of the groove in the next layer immediately below it so that the leg is held on the pallet by the top portions of the leg panels, tucked into the undercuts of the groove, and there is a tongue displaced from the material of the pallet and extending across the full width of the hollow interior of the leg, and both sides of the leg are held engaged in the undercuts by the tongue as a filler within the leg.

7. The load supporting pallet described in claim 6 and in which the legs are separate pieces from the platform and connected to the platform only by the tucking of the top edge panels into the undercuts of the grooves, and the tongues are formed of material displaced from the platform above the leg but secured to the platform along a score line which serves as a hinge for the tongue.

8. The load supporting pallet described in claim 1 and in which the platform above the legs has tongues displaced from the platform and extending downwardly into

the legs from hinge score lines along which the tongues remain connected to the platform, the tongues extending across the full width of the interior cross sections of the legs to brace the legs against inward collapse of their downwardly-extending panels.

References Cited in the file of this patent

UNITED STATES PATENTS

1,605,901 O'Neil ---------- Nov. 2, 1926
2,240,024 Stone ---------- Apr. 29, 1941
2,696,356 Baumann ---------- Dec. 7, 1954
2,744,713 De Villers ---------- May 8, 1956
2,758,776 Ellstrom ---------- Aug. 14, 1956
2,808,978 Wright ---------- Oct. 8, 1957

FOREIGN PATENTS

799,967 France ---------- Apr. 20, 1936