June 26, 1962 D. C. BROWN 3,041,029

COLLAPSIBLE PALLETS

Filed May 23, 1956 2 Sheets-Sheet 1

FIG. 1.

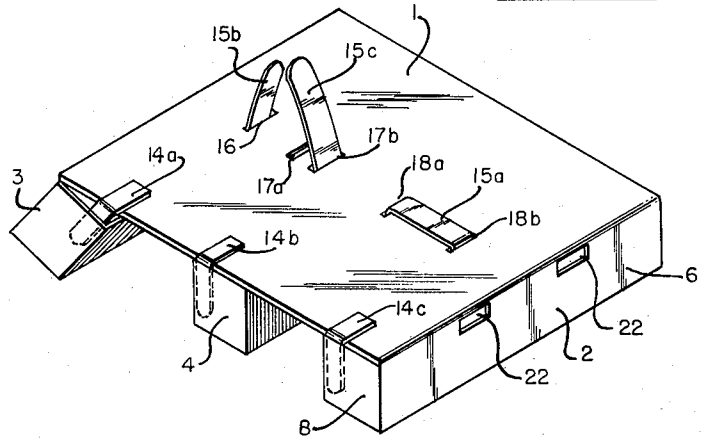
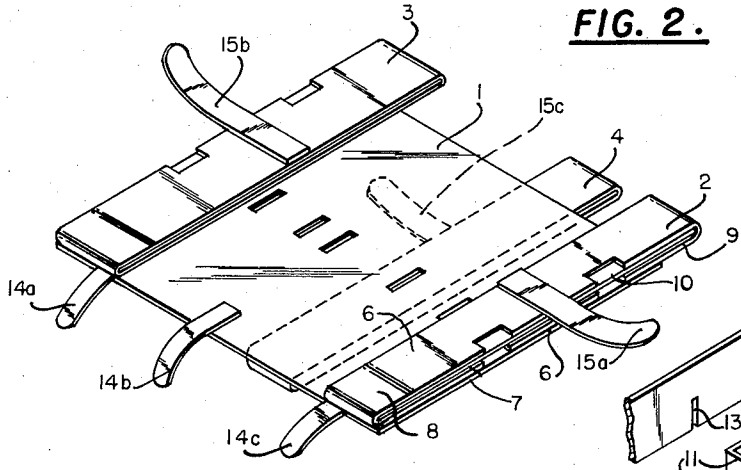


FIG. 2.



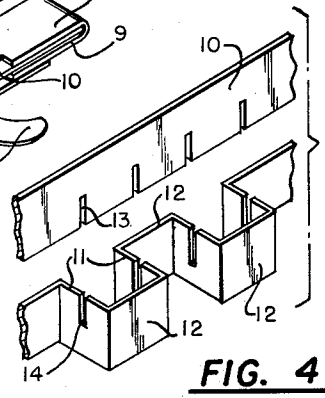
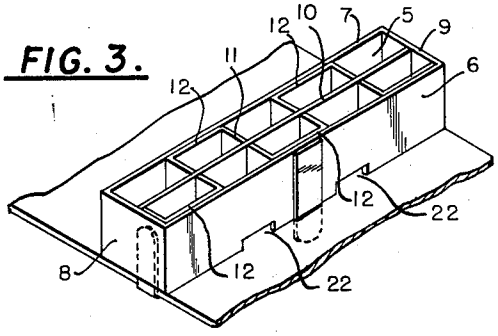


FIG. 4.

FIG. 3.



INVENTOR

DWIGHT C. BROWN

BY John Boyle

ATTORNEY

June 26, 1962 D. C. BROWN 3,041,029

COLLAPSIBLE PALLETS

Filed May 23, 1956 2 Sheets-Sheet 2

FIG. 5.

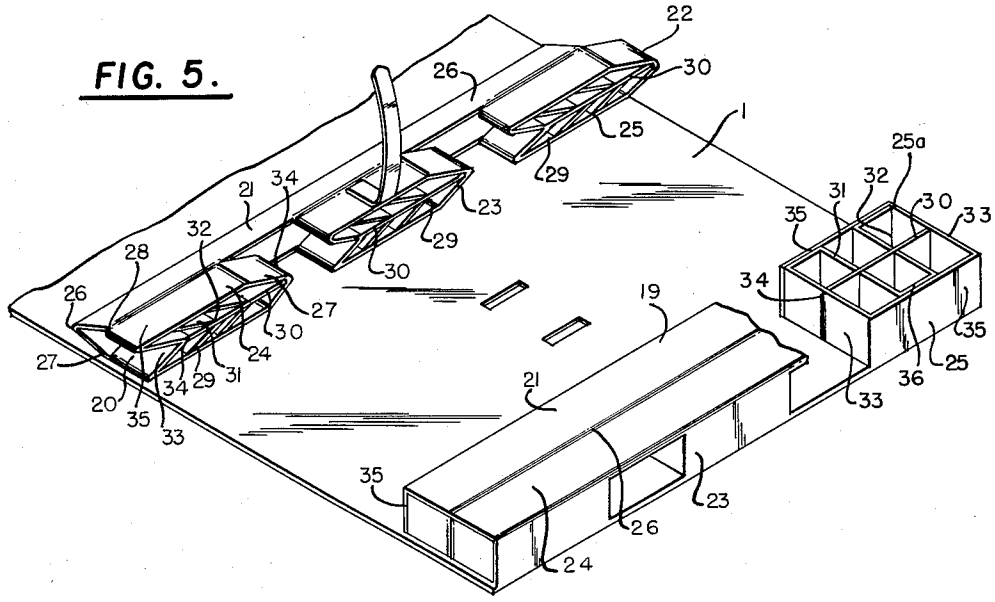


FIG. 6.

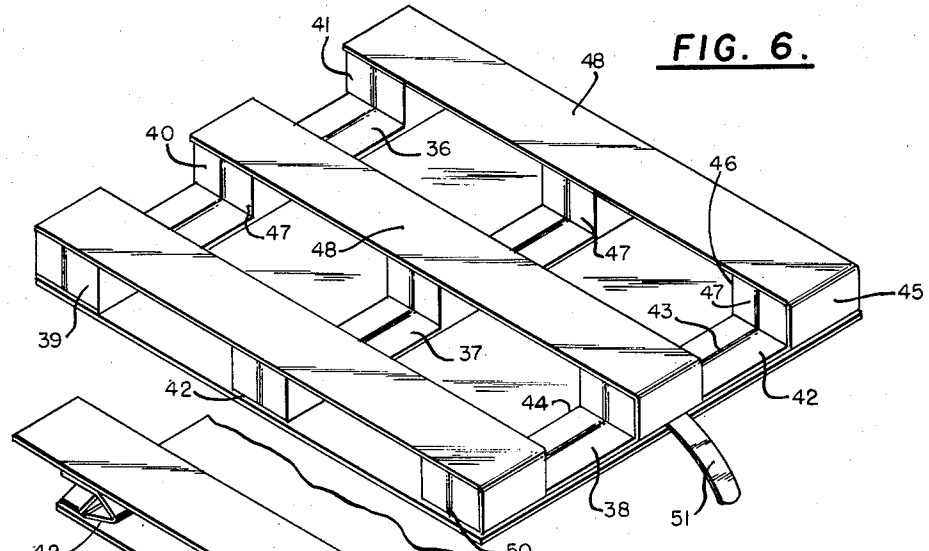
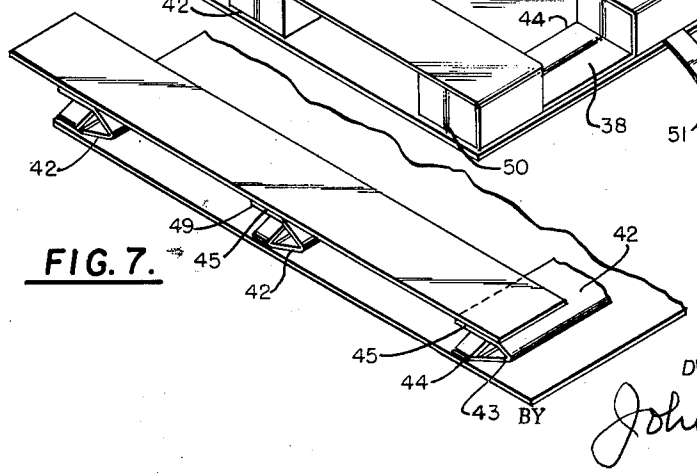


FIG. 7.



INVENTOR

DWIGHT C. BROWN

BY John Boyle

ATTORNEY

United States Patent Office 3,041,029 Patented June 26, 1962

3,041,029

COLLAPSIBLE PALLETS

Dwight C. Brown, Arlington, Va.

Filed May 23, 1956, Ser. No. 586,889
11 Claims. (Cl. 248—120)
(Granted under Title 35, U.S. Code (1952), sec. 266)

This invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon in accordance with the provisions of Title 35, United States Code, section 266.

This invention relates to folding or collapsible type pallets for use in shipping equipment and supply items and is designed to provide for unitized handling by the use of fork lift and pallet lift trucks in shipping and storage operations.

The invention has specific reference to pallets made chiefly of paperboard material of the expendable or disposal type used for initial shipment, distribution and storage, and reuse where desired, for transporting, handling and storing materials in unit loads.

Because of its economical cost as compared with conventional rigid type wood and metal pallets, the collapsible paperboard type of pallet as embodied in this invention may be expended after final distribution or consumption of the materials stored and shipped thereon.

While all the modifications are suitable adapted to fabrication from paperboard material, they can also be fabricated either wholly or in part from metal, plywood, veneer and laminated material having a wood veneer core with paper or paperboard on one or both sides.

The term "paperboard" as used herein refers to and includes corrugated board, fibreboard and other paper and fibrous products that are capable of supporting relatively medium and heavy weight loads. The paperboard material may wholly or in part be treated with resins, inorganic silicates, glues, synthetic rubber compounds, insecticides, corrosion inhibitors, moisture proofing materials, plastics and similar type materials for stiffening and strengthening.

One of the objects of the invention is to provide an inexpensive, light weight, substantially flat type pallet with novel folding and collapsible features embodied in the support members which provides a secure, simple, quick and easy means of setting up the pallet for use from a knock-down position and collapsing to a substantially flat form for return shipment or storage for reuse, if so desired.

Another object is to provide a pallet having a substantially flat shape when not set up for use, with folding or collapsible support members so designed and constructed as to enable instantaneous setup when needed for use with fork lift and pallet truck equipment with no additional fabrication, stapling or other assembly, fastening or insertion of component parts required for such setup.

A further object is to provide a pallet with support members so designed and constructed as to be folded or collapsed against the top and underside of the pallet deck enabling the furnishing and distribution of a complete pallet in substantially flat form. This avoids the disadvantages of permanently setup rigid pallets which take up or displace considerably more cubic space during transportation and storage by the manufacturer, distributor and user prior to use or during return shipment or storage pending reuse.

Referring to the drawings for a more complete disclosure of the invention:

FIGURE 1 is a top side perspective view of one form of the invention in partially setup position;

FIGURE 2 is a top side perspective view of the form shown in FIGURE 1 in a collapsed or folded position;

FIGURES 3 and 4 are detailed perspective views of the cellular support members;

FIGURE 5 is an underside fragmentary perspective view of a modified form;

FIGURE 6 is an underside perspective view of another modified form; and FIGURE 7 is a fragmentary perspective view of the near end of FIGURE 6 with the support members in a partially folded position.

Referring to FIGURE 1, **1** is the top supporting surface or deck of the pallet. Fastened in a hinged-like arrangement at one end is a honeycomb collapsible cell supporting member **2** and a similar collapsible supporting member **3** extends from the other end of the pallet. Hinged to the underside of the deck **1** is a collapsible supporting member **4** similar in construction to the members **2** and **3**. The exterior side of both end supporting members may be a continuation of the deck scored to provide a hinge-like arrangement.

In the folded position shown in FIGURE 2, the supporting members **2** and **3** are folded flat on top of the deck **1** and the supporting member **4** is folded flat on the underside of the deck **1**. In shipping the pallet in this flat folded position for subsequent use, the minimum amount of cubic space is used.

In the setup position, FIGURE 1, the supports **2** and **4** are in their expanded supporting position while in FIGURE 2 all the supports, **2**, **3** and **4** are in their folded or collapsed position. The support **3**, FIGURE 1, is in an intermediate position on its way to the same supporting position as support **2**, FIGURE 1.

The supports **2**, **3** and **4** in their unfolded, open, supporting position are as shown in FIGURE 3 and consist of cells **5** formed by sides **6** and **7** and ends **8** and **9** hinged to the sides **6** and **7**. The partition **10** has slots **13** that engage slots **14** in the partitions **11**. The sides **12** are fixedly secured to the sides **6** and **7**. All intersecting sides and partitions are hinged together at the intersections by scoring or other means.

In the folded position, FIGURE 2, the end **8** overlies the side **7** and is in a plane parallel to the side **7** and the end **9** underlies the side **6** and is in a plane parallel to the side **6**. The partition **10** is parallel with and interposed between the sides **6** and **7**. The partitions **11** are interposed between the sides **6** and **7** and are substantially parallel with the ends **8** and **9**.

To hold the supports **2**, **3**, and **4** in their setup position, there are provided a plurality of flexible fastening strips, **14***a*, **14***b* and **14***c* carried by the top **1** and similar strips, **15***a*, **15***b* and **15***c*, carried respectively by the supporting members, **2**, **3** and **4**. In the deck **1** of the pallet are a plurality of slots, **16**, **17***a*, **17***b*, **18***a* and **18***b*. The strip **15***b* engages with the slot **16**; the strip **15***c* engages with the slot **17***b*, and at its end with slot **17***a* when threaded therethrough. The strip **15***a* engages similarly with the slots **18***a* and **18***b*. The reinforcement strips fit tightly in the slots. When threaded through one slot the holding power may be sufficient or the strip can be threaded through an adjacent slot for additional holding power.

The strips **14***a*, **14***b* and **14***c* are threaded into one of the cells **5** of the supporting members in sufficiently tight frictional engagement with the walls of the cell to hold the supports in setup position.

In the case of light or comparatively light pallet loads the fastening strips **14***a*, **14***b* and **14***c* may be omitted and the anchoring of the cell supporting members may be accomplished in other ways.

The sides **6** and **7** may have cut-out slots **22** for fork lift truck entry.

In the pallet shown in FIGURE 5, the folding cellular supporting members are modified in their construction.

As in FIGURE 1 there are three rows of supports, two similar end supports 19 (only one being shown) that are arranged hinge-like to fold on top of the deck 1 and an intermediate support 20 that is hinged to and folds on the underside of the deck 1.

Each support member has a common bottom support panel 21 running transversely of the pallet and which serves as a means for maintaining the support cells 23, 24 and 25 in a proper expanded support position when a load is applied to the top of the pallet deck.

The panel 21 is foldable along the line 26. Each support cell is hinged to the panel 21 at 27 and 28 and hinged to the part 1 at 29.

The support cells in their open position are arranged as shown at 25*a* for the end support 19. In the folded position they are arranged as shown for the intermediate support 20.

The central partition 30 is hinged to the transverse partitions 31 at 32 and to the ends 33 at 34. The transverse partitions 31 and the ends 33 are hinged to the sides 35. The sides 36 of the cells are integral with the sides 35.

In folded position the sides 35 are in parallel planes and the folded sides of the panel 21 in approximately the same plane. Between the sides 35, the transverse partitions 31, the central partition 30 and the folded sides of the ends 33 are in planes approximately parallel to the sides 35.

In the modification, FIGURES 6 and 7, there are three rows 36, 37 and 38 of supporting cells extending transversely of the deck 1. All the rows are on the underside of the deck 1, both in folded and supporting position.

Each of the three rows is provided with three folding cellular supporting members, 39, 40 and 41. The internal construction of each of the folding cellular supporting components is the same as in the modification, FIGURE 5, but their arrangement on the panel and mode of operation is different.

The panels 42 extend transversely of the underside of the deck 1 and are foldable along the lines 43. Each panel 42 is hinged along one longitudinal edge to the underside of the deck 1 at 44 and at the same point to the lower edge of the inner sidewall 46 of the cellular supporting member. The panel 42 is hinged along its other longitudinal edge to the lower edge of the outer sidewall 45 of the cellular supporting member. The upper edge of the outer sidewall 45 of the cellular supporting member is hinged to the underside of the longitudinal strips 48 at 49. The side 47 of the cellular supporting member folds inwardly along the line 50 in the same manner as the end 33 as shown in FIGURE 5. A fastening tab 51 can be secured to a support for holding the pallet in setup position.

In shifting from the partly folded position of FIGURE 7, to the supporting position of FIGURE 6, the panel 42 rotates to the right about the hinge 44 to the flat position of FIGURE 6. The sides 45 and 46 rotate to the right about their hinged connections from a folded superposed substantially horizontal position to a vertical open cellular position overlying the panel 42.

The arrangement of FIGURES 6 and 7 are particularly adaptable for "four-way" fork lift truck entry and low lift pallet lift trucks. With this arrangement the pallet can be set up from knocked down position and held there by fastening with the tab 51 at only one point.

The arrangement of FIGURE 7 permits the simultaneous operation of all nine supporting members from the folded to the supporting position.

While three spacer strips are shown, a single panel full under-decking could be substituted for the separate strips without affecting the mode of operation.

It will be noted that the cellular supporting members are self-contained and are convertible from a folded to a supporting position without the addition of any separate reinforcing members, the integral honeycomb supporting structure being so designed as to be foldable within the sides of the members when in inoperative position.

I claim:

1. A portable materials handling accessory adapted for use in lift truck operations comprising a platform adapted to receive a load upon its upper surface and a plurality of spaced collapsible supporting units disposed beneath and elevating said platform, the supporting units having an open supporting position and a closed flat folded position, the supporting units when in an unfolded open supporting position being in the form of a rectangular receptacle, interconnected partitions fixedly secured within the sides of the receptacle when in folded and unfolded position, the units when in folded position having the sides of the receptacle in substantially parallel planes and the partitions interposed between the sides and substantially parallel therewith, the supporting units being collapsible from the open supporting position to the folded collapsed position without disassembling the units, the supporting units being pivotally connected only at one edge to the supporting platform and adapted to swing as a unit from supporting position to folded position.

2. A portable materials handling accessory adapted for use in lift truck operations comprising a platform adapted to receive a load upon its upper surface and a plurality of spaced collapsible supporting units disposed beneath and elevating said platform, the supporting units having an open supporting position and a closed flat folded position, the supporting units when in an unfolded open supporting position being in the form of a rectangular receptacle, interconnected partitions fixedly secured within the sides of the receptacle when in folded and unfolded position, the units when in folded position having the sides of the receptacle in substantially parallel planes and the partitions interposed between the sides and substantially parallel therewith, the supporting units being collapsible from the open supporting position to the folded collapsed position without disassembling the units, the supporting units being pivotally connected only at one edge to the supporting platform and adapted to swing as a unit from supporting position to folded position and means for securing the units in set up open supporting position against collapse to the flat folded position.

3. A portable materials handling accessory adapted for use in lift truck operations comprising a platform adapted to receive a load upon its upper surface and a plurality of spaced collapsible supporting units disposed beneath and elevating said platform, the supporting units having an open supporting position and a closed flat folded position, the units when in an unfolded open supporting position being in the form of a receptacle, reinforcing means fixedly secured within the receptacle when in folded and unfolded position, the units when in flat folded position having the reinforcing means located between the sides of the receptacle, the supporting units being collapsible from the open supporting position to the folded collapsed position without disassembling the units, the supporting units being pivotally connected only at one edge to the supporting platform and adapted to swing as a unit from supporting position to folded position.

4. The pallet of claim 3 in which a plurality of units are hinged to the underside of the deck and means connecting the units for simultaneously moving them from one position to the other position.

5. The pallet of claim 3 in which a supporting unit is hinged to the deck along one of the edges of the unit and adapted to swing as a unit from one position to the other position.

6. The pallet of claim 3 in which the supporting unit is hinged to the deck along one of the edges of the unit and adapted to swing as a unit from supporting position below the deck to folded position on top of the deck.

7. The pallet of claim 3 in which a fastening device is provided between the unit and the deck for holding the unit in supporting position.

8. The pallet of claim 3 in which a supporting unit is hinged at opposite sides of the deck and at the underside of

the deck, the units at the sides of the deck being in folded position on top of the deck.

9. A portable materials handling accessory adapted for use in lift truck operations comprising a platform adapted to receive a load upon its upper surface and a plurality of spaced collapsible supporting units disposed beneath and elevating said platform, the supporting units having an open supporting position and a closed flat folded position, the units when in an unfolded open supporting position being in the form of a receptacle, reinforcing means fixedly secured within the receptacle when in folded and unfolded position, the units when in flat folded position having the reinforcing means located between the sides of the receptacle, the supporting units being collapsible from the open supporting position to the folded collapsed position without disassembling the units, the supporting units being pivotally connected only at one edge to the supporting platform and adapted to swing as a unit from supporting position to folded position and means for securing the units in set up open supporting position and against collapse to the flat folded position.

10. A portable materials handling accessory adapted for use in lift truck operations comprising a platform adapted to receive a load upon its upper surface and a plurality of spaced collapsible supporting units disposed beneath and elevating said platform, the supporting units being in the form of a rectangular receptacle, interconnected partitions fixedly secured within the sides of the receptacle, the units having an open supporting position and a collapsed folded position, the units when in folded position having the sides of the receptacles in substantially parallel planes and the partitions interposed between the sides and substantially parallel therewith, the plane of the partitions being vertical in open supporting position of the units when in use, the units being collapsible from the open supporting position to folded position without disassembling the units, the supporting units being pivotally connected at only one edge to the supporting platform and adapted to swing as a unit from supporting position to folded position.

11. A portable materials handling accessory adapted for use in lift truck operations comprising a platform adapted to receive a load upon its upper surface and a plurality of spaced collapsible supporting units disposed beneath and elevating said platform, the supporting units being in the form of a rectangular receptacle, interconnected partitions fixedly secured within the sides of the receptacle, the units having an open supporting position and a collapsed folded position, the units when in folded position having the sides of the receptacles in substantially parallel planes and the partitions interposed between the sides and substantially parallel therewith, the plane of the partitions being vertical in open supporting position of the units when in use, the units being collapsible from the open supporting position to folded position without disassembling the units, the supporting units being pivotally connected at only one edge to the supporting platform and adapted to swing as a unit from supporting position to folded position, and means for securing the units in set up open supporting position against collapse to the flat folded position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,072,185	Smiley	Sept. 2, 1913
1,112,859	Smiley	Oct. 6, 1914
2,444,183	Cahners	June 29, 1948
2,503,240	Cahners	Apr. 11, 1950