

[54] **STACKABLE PALLET CONSTRUCTIONS**

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248/188, 188.8; 24/214-221

[56] **References Cited**

UNITED STATES PATENTS

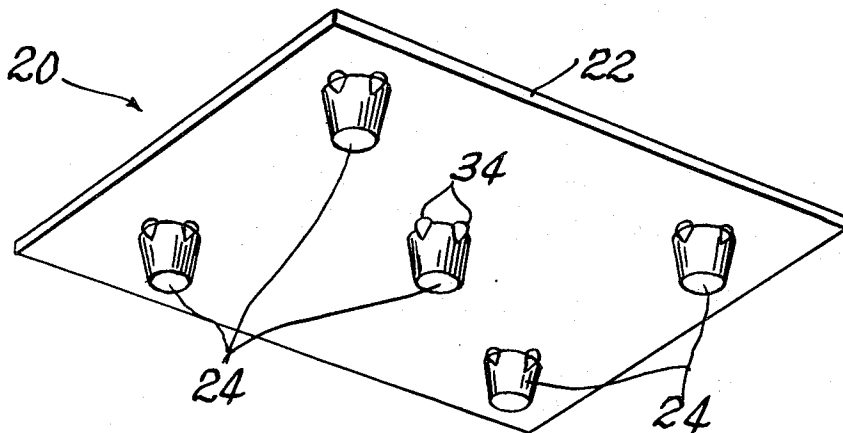
2,706,099	4/1955	Whalley.....	108/53
2,499,637	3/1950	Flora	24/213
3,267,888	8/1966	Carlson.....	248/188 X
2,451,591	10/1948	Tinnerman et al.	24/213 B
2,595,095	4/1952	O'Connor.....	24/213 B
3,141,422	7/1964	Woolworth.....	108/56
3,316,861	4/1967	Dailey.....	108/51
3,380,403	4/1968	Sullivan.....	108/51

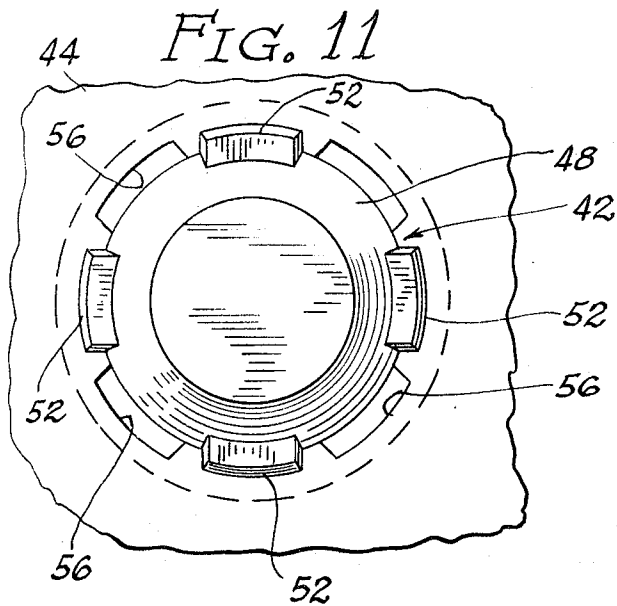
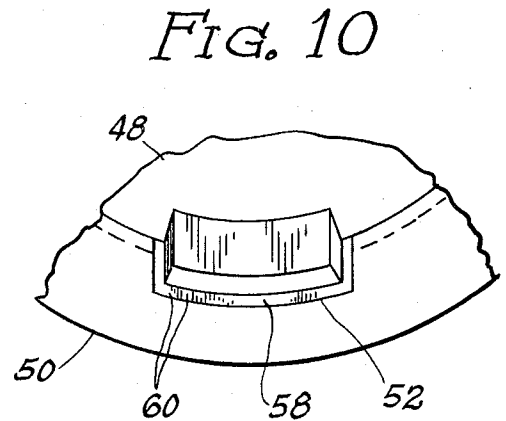
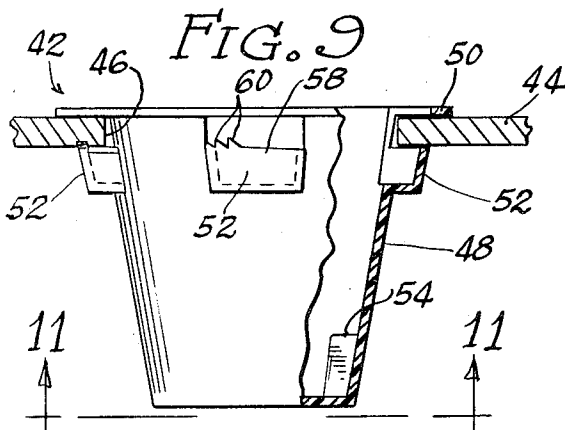
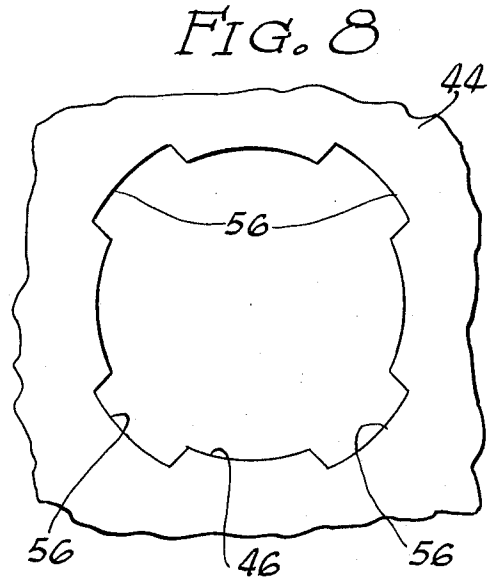
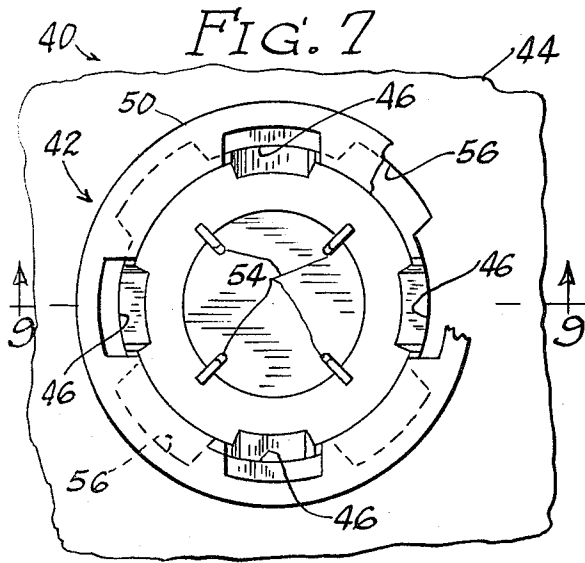
Primary Examiner—Bobby R. Gay
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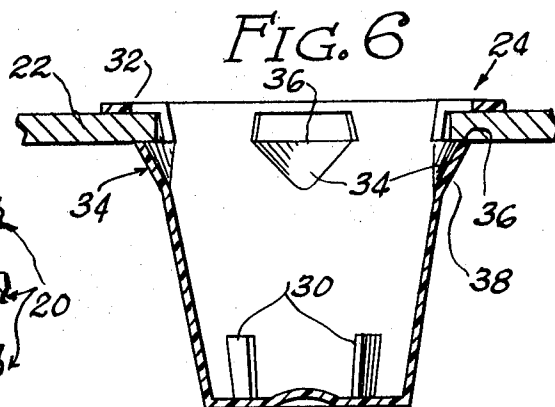
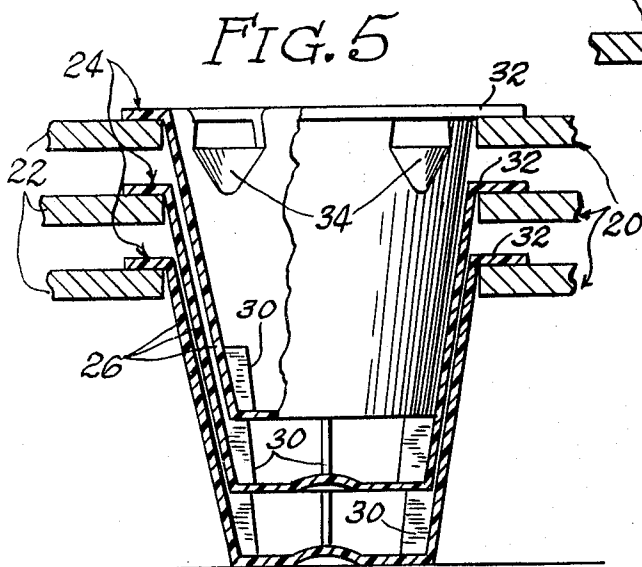
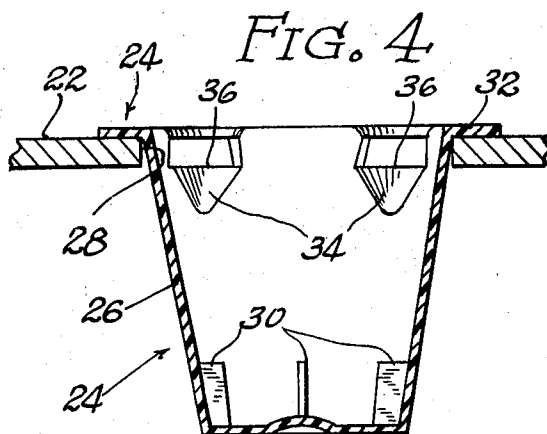
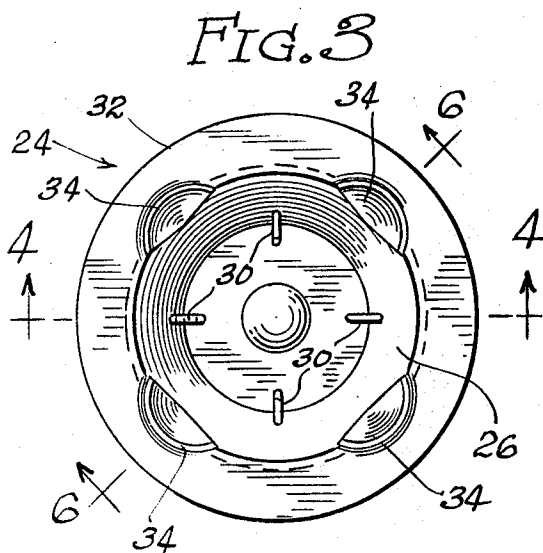
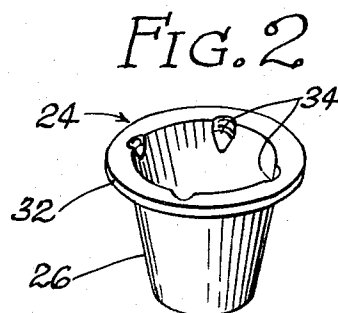
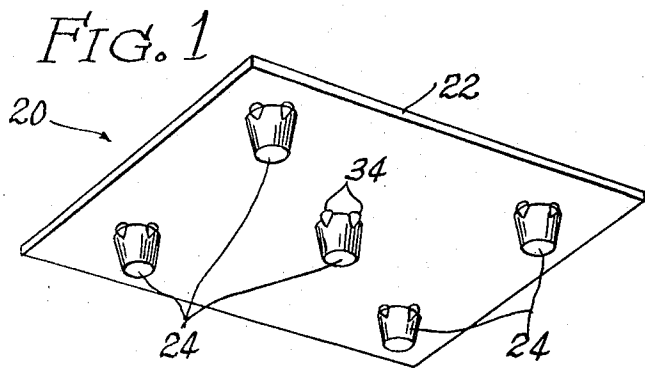
[57] **ABSTRACT**

The illustrated pallet comprises a plurality of legs having hollow cup-shaped bodies extending through openings in the pallet member, which may be made of corrugated cardboard or other suitable material. Each leg is made in one piece, preferably of plastic material. A flange projects outwardly from the upper end of the body and engages the upper surface of the pallet member. Each leg is retained in the corresponding opening by one or more lugs projecting outwardly from the body, for engagement with the underside of the pallet member. In one embodiment, each lug comprises an upwardly facing shoulder and a downwardly tapering side surface for temporarily displacing the material of the pallet member by a wedging action, when the body of the leg is forced through the corresponding opening. The displaced material of the pallet member snaps into its final position above each lug when the leg has been fully inserted. The cup-shaped bodies of the legs taper downwardly so as to be stackable. In another embodiment, the lugs are adapted to be inserted through cut-outs or notches formed in the edges of the openings. Each leg is then rotated to move the lugs under the pallet member. Each lug preferably has a shoulder which is inclined to produce a wedging action with the underside of the pallet member. One or more locking teeth are preferably provided on each shoulder, to dig into the material of the pallet member.

21 Claims, 11 Drawing Figures







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STACKABLE PALLET CONSTRUCTIONS

This invention relates to pallets of the general type comprising a pallet member, made of corrugated cardboard or other suitable material, and a plurality of legs projecting downwardly from the pallet member. The legs support the pallet member above the floor or other supporting surface, so that the fork of a lift truck can be inserted under the pallet member. In this way, the pallet and the items supported thereon can easily be lifted and handled by the fork lift truck. Such pallets are widely used for supporting a wide variety of cartons and other items to be shipped or otherwise handled. The items to be palletized may be secured to the pallet by steel strapping, reinforced paper tape, or any other suitable means.

One object of the present invention is to provide a new and improved pallet construction having legs which are stackable, or adapted to nest one within another so that the pallets can be stacked very compactly for storage and shipment.

A further object is to provide a new and improved pallet construction having stackable legs, each of which can be made in one piece, preferably of plastic material.

Another object is to provide a new and improved pallet construction having one piece legs which can be inserted through openings in the pallet member, each leg being provided with one or more lugs for retaining the leg in its opening.

It is a further object to provide such a new and improved pallet construction in which the lugs can be forced through the openings in the pallet member, the material of the pallet member being displaced temporarily and being adapted to snap into its final position above the lugs.

Another object is to provide a modified construction in which each leg is rotated, after being inserted through its opening, so as to move the lugs into locking engagement with the underside of the pallet member.

Generally, the pallet construction of the present invention comprises a thin pallet member, made of corrugated cardboard or some other suitable material. Legs are inserted through openings in the pallet member. Each leg is preferably made in one piece of a resinous plastic or some other suitable material. Each leg has a hollow cup-shaped body adapted to be inserted through one of the openings in the pallet member. The body preferably tapers downwardly so that several of the legs can be stacked or nested for compact storage and shipment. Stop means preferably project upwardly within the body to limit the insertion of one leg into another, so that the stacked legs will not wedge together. It is preferred to form each leg with a flange projecting outwardly from the upper end of the body, for engagement with the upper surface of the pallet member. One or more lugs project outwardly from the cup-shaped body for engagement with the underside of the pallet member. Each lug preferably has an upwardly facing shoulder and a downwardly tapering side surface, for temporarily displacing the material of the pallet member when the leg is pushed through the opening therein. The displaced material snaps into its final position above the shoulder when the leg has been fully inserted.

In a modified construction, the lugs are inserted through notches or cut-outs in the edges of the openings. Each leg is then locked by rotating it, so as to move the lugs under the pallet member. Preferably, each lug has a shoulder with a peripheral inclination so as to produce a wedging action between the shoulder and the underside of the pallet member. One or more locking teeth are preferably provided on the shoulder to dig into the material of the pallet member so as to prevent the leg from coming loose.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which:

FIG. 1 is a perspective view showing the underside of a pallet to be described as an illustrative embodiment of the present invention.

FIG. 2 is an enlarged perspective view showing one of the legs of the pallet.

FIG. 3 is a top view of the leg.

FIG. 4 is a vertical section, taken along the line 4—4 in FIG. 3, and showing the leg in its position of use on the pallet member.

FIG. 5 is a view similar to FIG. 4, but showing the manner in which the pallets can be stacked, with the legs nested.

FIG. 6 is a vertical section, similar to FIG. 4, but taken along the line 6—6 in FIG. 3.

FIG. 7 is a top view showing a modified pallet construction, with a portion of the leg broken away.

FIG. 8 is a fragmentary plan view showing the modified opening in the pallet member.

FIG. 9 is an elevational view, partly in section along the line 9—9 in FIG. 7.

FIG. 10 is a fragmentary enlarged plan view showing the modified lug construction of the pallet leg, shown in FIG. 7.

FIG. 11 is a bottom view taken as indicated by the line 11—11 in FIG. 9.

With further reference to FIG. 1, it will be seen that this view illustrates a pallet 20 comprising a thin pallet member 22 having a plurality of legs 24. The pallet member 22 is preferably made of corrugated cardboard, but may be made of other suitable materials, such as various types of board, plastics or the like. The material should be somewhat resilient and sufficiently soft or flexible to permit the insertion of the legs 24.

It will be seen from FIGS. 1—6 that each leg 24 preferably comprises a generally cup-shaped body 26, adapted to be inserted through an opening 28 in the pallet member 22. The illustrated leg bodies 26 are circular in horizontal cross section, as are the openings 28, but legs of other shapes may be employed if desired. Each of the illustrated legs 24 is preferably molded in one piece of a suitable plastic material, but other suitable materials may be employed if desired.

It will be evident that each pallet 20 will normally have at least three of the legs, while four legs would be considered a more suitable minimum number. The pallet 20, as shown in FIG. 1, has five legs, to illustrate the fact the more than four legs may be employed, as needed to provide the desired load-carrying capacity.

The cup-shaped body 26 of each leg 24 preferably tapers downwardly and is hollow in construction, so that the legs can be stacked or nested, as shown to best advantage in FIG. 5. This feature makes it possible to stack the pallets with the legs nested, for compact storage and shipment.

Stop means 30 are preferably provided within the cup-shaped body 26 of each leg 24, to limit the insertion of one leg within another, so that the legs will not wedge together when they are stacked. As shown, the stop means 30 comprise ribs or fins projecting upwardly and inwardly within the hollow body 26. When the legs are stacked, the ribs 30 of each leg support the lower end of the leg above.

Each leg 24 is preferably formed with a flange 32, projecting outwardly from the upper end of the cup-shaped body 26. The flange 32 is adapted to engage the upper supporting surface of the pallet member 22. While the illustrated flange 32 extends continuously around the entire periphery of the body 26, it will be understood that discontinuous flange elements may be employed.

Each of the illustrated legs 24 has one or more lugs 34 projecting outwardly from the cup-shaped body 26, and spaced downwardly from the flange 32. Each of the legs 24 shown in FIGS. 1—6 has four such lugs 34, but a lesser or greater number may be employed. Each lug 34 has an upwardly facing shoulder 36 adapted to engage the underside of the pallet member 22 so as to retain the leg 24 within the opening 28. Preferably, a downwardly tapering side surface 38 is formed on each lug 34 below the shoulder 36. When the leg 24 is pressed through the opening 28, the tapering side surface 38 has a wedging action which temporarily displaces the material of the pallet member 22, particularly when such material is corrugated cardboard or some other relatively compliant material. When the leg 24 has been fully inserted, the displaced material snaps inwardly into its final position, above

the corresponding shoulder 36. In this way, the leg 24 is securely retained within the opening 28.

The legs 24 of FIGS. 1-6 are thus mounted on the pallet member 22 by pressing the legs through the openings 28 therein. This operation can be done by hand, but is more easily accomplished with the aid of a mechanical press.

The legs 24 can also be used with pallet or deck members made of relatively rigid materials, such as wood, for example. In that case, the plastic side walls of the legs 24 are caused to flex inwardly when the tapered wedge elements 38 are forced through the openings 28 in the pallet member 22. When each leg has been fully inserted, the side walls snap outwardly so that the shoulders 36 are moved into their final positions, under the deck or pallet member 22.

FIGS. 7-11 illustrate a modified pallet 40 having legs 42 which are locked to the pallet member 44 by rotating the legs, after they have been inserted through openings 46 in the pallet member 44. As before, each leg 42 preferably comprises a downwardly tapering, frusto-conical body 48 having an outwardly projecting flange 50 at its upper end. One or more outwardly projecting lugs 52 are formed on the body 48 to engage the underside of the pallet member 44. As before, ribs or other stop means 54 are preferably formed within the hollow body 48, to limit the extent to which the legs can be nested, so that they will not wedge together.

In the modified construction of FIGS. 7-11, each opening 46 in the pallet member 44 is formed with one or more notches or cut-outs 56 to receive the lugs 52. Thus, it is easy to insert the legs 42 through the openings 46, with the lugs 52 lined up with the notches 56. The legs are then locked in place by rotating them, so as to move the lugs 52 under the pallet member 44.

Preferably, each lug 52 has a shoulder 58 with a peripheral inclination. Thus, each shoulder 58 acts as a ramp, movable into wedging engagement with the underside of the pallet member 44. One or more locking teeth 60 are preferably formed on each shoulder 58 to engage the underside of the pallet member 44. The teeth 60 are adapted to dig into the material of the pallet member 44 so as to prevent the leg 42 from coming loose. It will be seen that each tooth 60 is barb-shaped so that the leg is easy to tighten but hard to loosen.

Various other modifications, alternative constructions and equivalents may be employed, as will be evident to those skilled in the art.

I claim:

1. A pallet construction, comprising a thin sheet-like pallet member having a supporting surface adapted to receive items to be palletized, said pallet member having a plurality of openings therein, and a plurality of legs mounted in said openings and projecting downwardly from said pallet member, each leg being formed in one piece and having a hollow generally cup-shaped body extending through the corresponding opening, said cup-shaped body of each leg tapering downwardly to provide for the stacking of the legs of a plurality of pallets, each leg having a flange projecting outwardly from the upper end of said cup-shaped body and disposed above the supporting surface of said pallet member, each leg having a plurality of lugs projecting outwardly from said cup-shaped body and engageable with the underside of said pallet member for retaining said leg in the corresponding opening, each leg including stop means disposed within said cup-shaped body and spaced upwardly from the lower end thereof for limiting the insertion of the stacked legs into one another so as to prevent the stacked legs from wedging together.
2. A pallet construction according to claim 1, in which the downward extent of each lug below the upper end of each leg is limited to a distance corresponding generally to the height of said stop mean above the lower

end of said leg to prevent said lugs from interfering with the stacking of said legs.

3. A pallet construction according to claim 1, in which each leg has a lower portion which engages said stop means and nests within the underlying leg when the legs are stacked, each of said lugs being disposed on the corresponding leg above said lower portion thereof to prevent said lugs from interfering with the stacking of said legs.
4. A pallet construction according to claim 1, in which said openings in said pallet member are circular in shape, each lug comprising an upwardly facing shoulder for engaging the underside of said pallet member, each lug having a tapering side member facing downwardly below said shoulder for engaging said pallet member with a wedging action to provide for the forcible passage of said lug through the corresponding opening in said pallet member.
5. A pallet construction according to claim 1, in which said stop means comprise a plurality of ribs formed within said cup-shaped body.
6. A pallet construction according to claim 1, in which said pallet member is formed with notches connecting with each opening for admitting the corresponding lugs, each leg being rotatable in the corresponding opening to move said lugs under said pallet member, each lug having an upwardly facing shoulder provided with at least one locking tooth projecting upwardly therefrom to engage the underside of said pallet member.
7. A pallet construction according to claim 1, in which said openings in said pallet member are circular in shape, each lug having an upwardly facing shoulder for engaging the underside of said pallet member, each lug having a downwardly tapering wedge-shaped side surface for engaging said pallet member to provide for forcible passage of said lug through the corresponding opening in said pallet member, said wedge-shaped side surface being tapered downwardly in both width and radial protrusion from said cup-shaped body toward a point on said cup-shaped body spaced a substantial distance above the lower end of said body.
8. A pallet construction according to claim 6, in which each leg has a lower portion which engages said stop means and nests within the underlying leg when the legs are stacked, each leg being disposed on the corresponding leg above said lower portion thereof to prevent said lugs from interfering with the stacking of said legs.
9. A pallet construction according to claim 1, in which said pallet member is formed with notches connecting with each opening for admitting the corresponding lugs, each leg being rotatable in the corresponding opening to move said lugs under said pallet member, each lug being formed with an upwardly facing shoulder having an inclination in a peripheral direction to provide for a wedging action between said shoulder and the underside of said pallet member.
10. A pallet construction according to claim 9, in which each shoulder is provided with at least one locking tooth projecting upwardly therefrom for digging into the underside of said pallet member.
11. A pallet construction, comprising a thin sheet-like pallet member having a plurality of circular openings therein, and a plurality of legs mounted in said openings and projecting downwardly from said pallet member, each leg being formed in one piece and having a hollow generally cup-shaped body of circular cross section and extending through the corresponding opening,

said cup-shaped body of each leg having a lower portion dimensioned to nest within another leg to provide for the stacking of the legs of a plurality of pallets,
 each leg having a flange projecting outwardly from the upper end of said cup-shape body and disposed above said pallet member,
 each leg having a plurality of lugs projecting outwardly from said cup-shaped body and engageable with the underside of said pallet member for retaining said leg in the corresponding opening,
 each lug having an upwardly facing shoulder for engaging the underside of said pallet member,
 each lug having a downwardly tapering side member below said shoulder for engaging said pallet member around the corresponding opening with a wedging action to provide for the forcible passage of said lug through the corresponding opening in said pallet member.
 12. A pallet construction according to claim 11, in which said wedge-shaped side surface of each lug is tapered downwardly in both width and radial protrusion from said cup-shaped body toward a point on said cup-shaped body spaced a substantial distance above the lower end of said body.
 13. A pallet leg for use with a thin pallet member having leg receiving openings therein, comprising a hollow cup-shaped body adapted to be inserted through one of the openings, a flange formed in one piece with said body and projecting outwardly from the upper end thereof for engaging the upper surface of the pallet member, a plurality of lugs formed in one piece with said body and projecting outwardly therefrom in downwardly spaced relation to said flange for insertion through the opening to engage the underside of the pallet member, said cup-shaped body tapering downwardly to provide for the stacking of a plurality of the legs, and stop means disposed within said cup-shaped body and spaced upwardly from the lower end thereof for limiting the insertion of the stacked legs into one another so as to prevent the stacked legs from wedging together.
 14. A leg according to claim 13, in which each lug comprises an upwardly facing shoulder, and a downwardly tapering wedge-shaped side surface to provide for the forcible insertion of the lug through the corresponding opening in the pallet member.
 15. A leg according to claim 13, in which each lug comprises an upwardly facing shoulder having a peripheral inclination to provide a wedging action against the underside of the pallet member, the cup-shaped body being adapted to be rotatable in the corresponding opening in the pallet member, the pallet member having notches connecting with said openings for receiving the lugs.
 16. A leg according to claim 13,

in which each lug comprises an upwardly facing shoulder having at least one locking tooth projecting upwardly therefrom.
 17. A pallet leg according to claim 13, in which said cup-shaped body has a lower portion which engages said stop means and nests within the underlying leg when the legs are stacked, each of said lugs being disposed on said cup-shaped body above said lower portion thereof to prevent said lugs from interfering with the stacking of the legs.
 18. A pallet leg according to claim 13, in which the downward extent of each lug below the upper end of said leg is limited to a distance corresponding generally to the height of said stop means above the lower end of said leg to prevent said lugs from interfering with the stacking of the legs.
 19. A pallet leg according to claim 13, in which each lug has an upwardly facing shoulder for engaging the underside of the pallet member, each lug having a downwardly tapering wedge-shaped side surface for engaging the pallet member to provide for forcible passage of said lug through the corresponding opening in the pallet member, said wedge-shaped side surface being tapered downwardly in both width and radial protrusion from said cup-shaped body toward a point on said body spaced a substantial distance above the lower end of said body.
 20. A pallet leg for use with a thin pallet member having leg receiving openings therein, comprising a hollow generally cup-shaped body of circular cross section and adapted to extend through one of the openings in the pallet member, said cup-shaped body tapering downwardly to provide for the stacking of a plurality of the legs, a flange formed in one piece with said body and projecting outwardly from the upper end of said body for engagement with the upper side of the pallet member, and a plurality of lugs projecting outwardly from said cup-shaped body for engagement with the underside of the pallet member to retain the leg in one of the openings in the pallet member, each lug having an upwardly facing shoulder for engaging the underside of the pallet member, each lug having a downwardly tapering side member below said shoulder for engaging the pallet member with a wedging action to provide for the forcible passage of said lug through the corresponding opening in the pallet member.
 21. A pallet leg according to claim 20, in which said wedge-shaped side surface is tapered downwardly in both width and radial protrusion from said cup-shaped body toward a point on said body spaced a substantial distance above the lower end of said body.

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