Dec. 29, 1959 T. N. DE PEW 2,919,090

PALLET CONSTRUCTION

Filed May 31, 1957 2 Sheets-Sheet 1

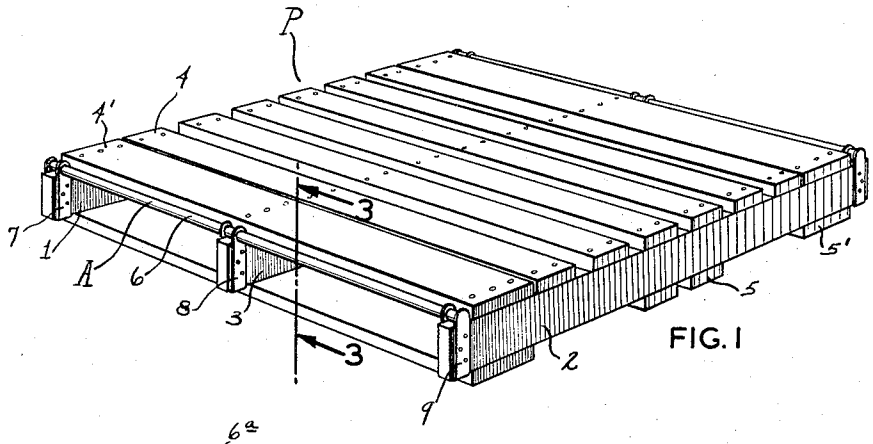


FIG. 1

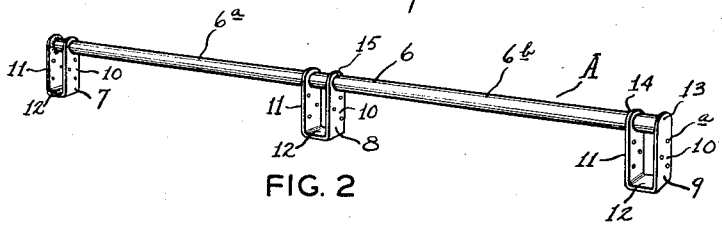


FIG. 2

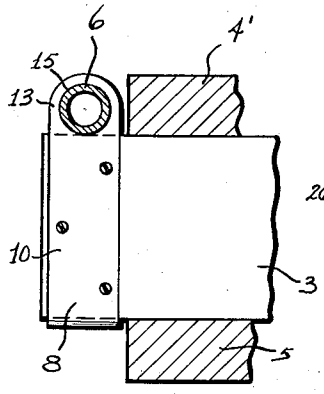


FIG. 3

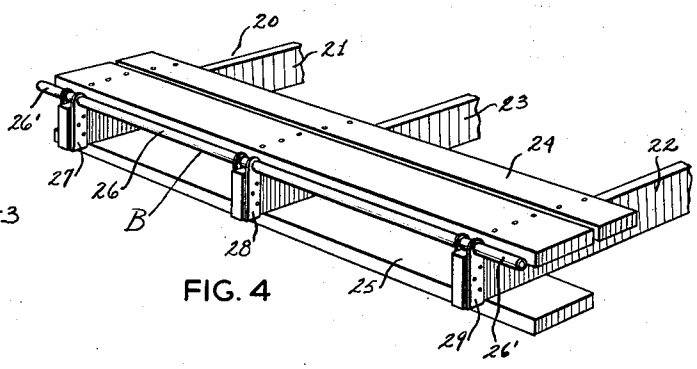


FIG. 4

INVENTOR.

THOMAS N. DE PEW

BY Ralph W. Kalish

ATTORNEY

Dec. 29, 1959 T. N. DE PEW 2,919,090

PALLET CONSTRUCTION

Filed May 31, 1957 2 Sheets-Sheet 2

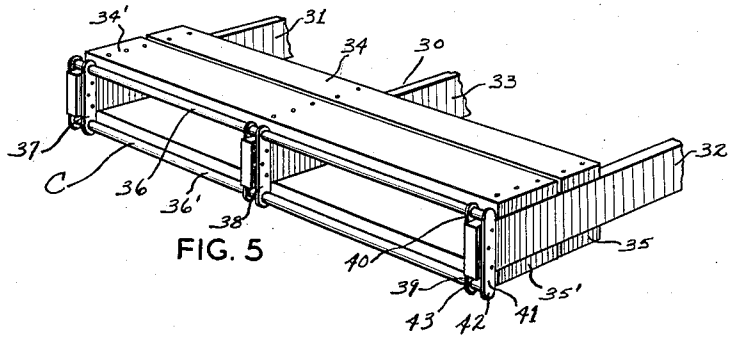


FIG. 5

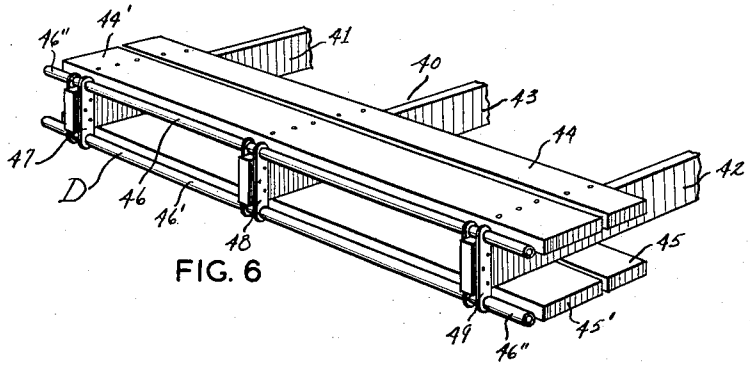


FIG. 6

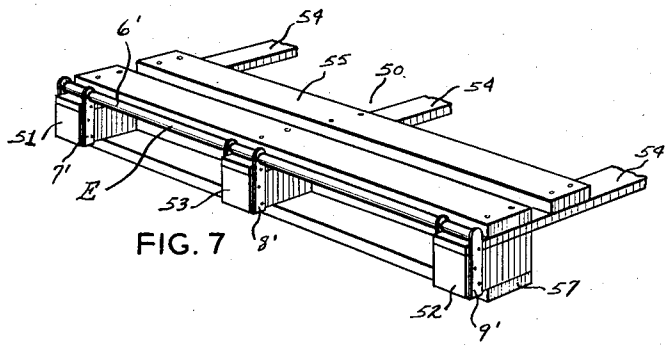


FIG. 7

INVENTOR.

BY THOMAS N. DE PEW

Ralph W. Kalish

ATTORNEY

United States Patent Office 2,919,090
Patented Dec. 29, 1959

2,919,090

PALLET CONSTRUCTION

Thomas N. De Pew, University City, Mo., assignor to Arrowhead Products, Inc., St. Louis, Mo., a corporation of Arkansas

Application May 31, 1957, Serial No. 662,633

10 Claims. (Cl. 248—120)

This invention relates in general to industrial pallets and, more particularly, to pallets incorporating unique damage-protection members.

The expense of pallet maintenance in industry has proved, and is continually proving, an ever increasing cost of operation and hence has been a matter of considerable moment to quantity users. It has been found that pallet damage is occasioned primarily by the usual hurried and careless operation of fork lift trucks, such as immediately prior to and during the insertion of the forks into the fork-receiving openings. The said forks and adjacent portions of the truck are brought forcibly into contact with pallet elements which are not designed to withstand the impact. Limited pounding of this character results in a fracturing of the end deckboards and requires the replacement thereof. Also, the presentation of the forks at an improper angle to the deckboards during the lifting operation will tend to centralize the elevating force upon the end deckboards, rather than dispersing such force over numerous of the deckboards and results in ripping of the end deckboards over the fastener heads, such as nails, or quickly develops a loosening of the nails so that the latter will fall out. A splitting of the stringer ends, with resultant nail failure and destruction of the pallet corners, is consistently brought about when the forks of a fork lift truck are abuttingly brought against the end portions of side faces of the stringers for the purpose of swinging the pallet so as to present the openings thereof in alignment with the lift truck forks.

Pallets are also damaged by generally negligent handling, such as when workmen manually stack same or remove them from storage.

Heretofore, various expedients have been attempted to protect pallets so as to increase their initial useful life and hence to reduce the ever-mounting maintenance charges. However, such expedients have for the most part consisted of applying directly to portions of the pallet reinforcing members, such as of angle iron, bar stock, or the like, or, substituting members of metal for those normally of wood. None of these efforts have proved successful. With reinforcing members, the same have been immediately secured to peripheral edge portions of the pallet such as along the transverse as well as longitudinal edges of the deckboards and the end surfaces of the stringers. Thus, these members, in effect, are merely, what one might term, armor plating or edge bindings. Extensive destructive tests have been conducted to determine the efficacy of such reinforcing members and the results of these tests have proved beyond doubt that pallets so equipped are but slightly more resistant to damage than those pallets not so provided. With the immediate attachment of such armor elements to portions of the pallet, it will be recognized that forces operating upon such members will be immediately transmitted to the pallet, so that with each blow received by the reinforcing members the wooden portions of the pallet will receive damage.

The other expedient of substituting, for instance, metallic stringers for the usual wooden stringers has also proved unsuccessful, as the same has not in any way protected the pallet in its most vulnerable point, namely, the end deckboards. Additionally, the cost of pallets incorporating metallic stringers has been so relatively high as to render the same uneconomical.

Therefore, it is an object of the present invention to provide a pallet incorporating protective members in its end portions which will resist damage to the end deckboards and stringers as might normally be occasioned a pallet through negligent fork lift truck operation whereby the pallet will remain in a fully useful state for periods long exceeding currently available pallets.

It is another object of the present invention to provide a pallet having mounted thereon protective members which are so positioned with respect to the pallet elements as to prevent transmission of damaging forces to the adjacent portions of the pallet.

It is another object of the present invention to provide pallets having protective members mounted on opposite ends thereof which are so designed as to transmit to the lower portion of the pallet improperly centralized forces acting liftingly upon the upper portion of the pallet.

Another object of the present invention is to provide a protective member for pallets which may be readily mounted upon existing pallets without necessitating extensive modification thereof or requiring highly skilled labor.

A further object of the present invention is to provide pallets incorporating the protective members of the type stated at its ends which may be economically manufactured; the use of which reduces pallet maintenance cost to a minimum; which pallets may be of any construction or design with the stringers and deckboards being made of wood; and which pallets have been extensively tested and proven reliable and durable.

An additional object of the present invention is to provide pallets incorporating end protective members which shield the end boards against undesired upward ripping from the stringers under forces applied by steel straps, or other banding means, for securing loads upon the pallet against displacement during shipping, as well as to guard the end members against fracturing or breaking due to lifting forces effected thereon by cargo slings.

These and other detailed objects are obtained by the structures illustrated in the accompanying drawings (two sheets) in which—

Figure 1 is a perspective view of a flush-stringer-type pallet incorporating protective members constructed in accordance with and embodying the present invention.

Figure 2 is a perspective view of the protective member of the type shown in Figure 1.

Figure 3 is a vertical transverse section taken on the line 3—3 of Figure 1.

Figure 4 is a partial perspective view of an inset-stringer-type pallet incorporating another form of protective member constructed in accordance with and embodying the present invention.

Figure 5 is a partial perspective view of a reversible or double-faced, flush-stringer type pallet incorporating a further form of protective member of the present invention.

Figure 6 is a partial perspective view of a double-faced inset-stringer-type pallet incorporating a further form of protective member of the present invention.

Figure 7 is a partial perspective view of a flush-block-type pallet incorporating a protective member of the present invention.

Referring now by reference characters to the drawings which illustrate the preferred embodiments of the present invention, P designates a pallet of the conventional single-faced, flush-stringer design, having spaced apart, parallel,

longitudinally extending outer stringers 1, 2 and a center stringer 3, with upper and lower decks each comprised of a plurality of spaced, transverse boards 4, 5, respectively; said boards being engaged in their end and center portions upon the adjacent edges of stringers 1, 2, 3, as by nails; there being less boards in the lower deck than the upper deck, which latter is hence for load reception. The end boards 4', 5' of the respective upper and lower decks are spaced inwardly a short distance from the proximate ends of stringers 1, 2, 3, for purposes presently appearing.

Mounted upon each end of pallet P is a protective member indicated generally at A, which comprises an elongated tube 6, preferably of steel, or other rigid material, and of any desired cross section, such as annular, square, etc., and being substantially as long as the deckboards. Said tube 6 is supported at its ends by brackets 7, 9 and centrally by bracket 8, which brackets are respectively engaged upon stringers 1, 2, 3. Each bracket 7, 8, 9 is U-shaped having vertically presented, flat parallel arms 10, 11 and a base connecting web 12; each bracket being dimensioned for snugly embracing the projecting end portion of the related stringer, with web 12 and arms 10, 11, respectively abutting on their inner surfaces the underface and side faces of the associated stringer. Arms 10, 11 are provided with a series of perforations as at *a* for extension therethrough of fasteners, such as nails, for securing the brackets to their related stringer. Arms 10, 11 of each bracket project upwardly above their related stringer to provide extensions 13, 14, respectively, the upper edges of which may be rounded and are substantially aligned in their upper extreme portion with the upper surface of deckboards 4.

At its ends, tube 6 is fixedly secured, as by welding, to the inner surface of the extension of the outer arm of each end bracket 7, 9 and extends freely through aligned openings 15 provided in the extensions of the inner arm of said brackets 7, 9 and through those of center bracket 8. Thus, center bracket 8 may be shifted longitudinally of tube 6 for alignment with center stringer 3 so as to facilitate mounting of protective member A upon pallet P, and the inner arms of end bracket 7, 9 may be slightly forced toward each other to permit ease of mounting of said brackets on the outer stringers 1, 2. As shown most clearly in Figure 3, brackets 7, 8 and 9 are disposed spacedly from the proximate deckboards and thereby present tube spacedly therefrom. Furthermore, by extensions 13, 14 of the bracket arms tube 6 is disposed slightly spacedly above stringers 1, 2 and 3. By this unique disposition of tube 6 contact or engagement between protective member A and the end board 4' shielded thereby is prevented.

Brackets 7, 8, 9 thus cooperate to form a three-support system for tube 6, whereby the same is effectively reduced to two, distinct shielding sections 6*a*, 6*b*, of relatively limited span, with each such section being therefor increasedly resistant to deformation under forces normally capable of deforming or bending a single span co-extensive with tube 6 when supported only at its extremities. Center bracket 8 serves to reinforce tube 6 in its central and most readily bendable portion so that forces applied to both sections 6*a*, 6*b* will not produce a central bowing. The tendency of one section 6*a* or 6*b* to bend under force will thus be resisted by the shortness of their lengths, the anchoring of the center of tube 6, and the "biting" of edge portions of end brackets 7, 9 into the related stringers 1, 2 as said brackets may be caused to be pivoted inwardly by any inward deflection of the adjacent section toward the proximate deckboard 4'.

Due to the novel spacing of tube 6 from its adjacent deckboard 4', forces operating upon said tube will not be transmitted to the deckboard which hence will remain in its original, undamaged state. Such forces will be dissipated along tube 6 through the brackets 7, 8, 9 and to stringers 1, 2, 3. The stringers are the strongest elements of a pallet and hence most capable of resisting impact and furthermore, in being presented longitudinally will provide an extensive path through which the pounding received may be dissipated. Thus, by the use of the novel protective members of this invention, the forces which have heretofore acted directly upon the end boards, and through their narrowest dimension, will be directed to those elements designed to resist damage. Consequently, the improper, slamming type of contact normally brought about by the heel portions of the forks of fork lift trucks when the same are being addressed to a pallet will be received by tube 6 and, hence, not as customarily, by the end deckboards. Thus, protective member A serves to prevent fracturing of the end deckboards in a most consistently reliable and positive manner. Furthermore, when the forks of a fork lift truck are disposed at an improper angle, that is, wherein the outer ends are lower than the inner or heel-adjacent portions, the upward force developed thereby will be applied directly upon tube 6, and not upon the end deckboards, and through brackets 7, 8 and 9 such force will be transmitted to the under portions of the stringers 1, 2, 3 so that the improper lifting pressure will be operating upon the lower and stronger portion of the pallet and not upon the deckboard as heretofore. Thus, this feature brought about by the novel construction of protective member A will prevent ripping of the endboards and nail failure, as has been an expected result heretofore from improper lifting.

Furthermore, protective mmebers A integrate the stringers 1, 2 and 3 into a unitary, tied-together, system so that any laterally directed forces upon such stringers will be effectively resisted. Thus, the presentation of the ends of forks to the end portions of the inner side faces of two stringers, such as 2, 3, for the purpose of swinging the pallet so as to facilitate entry of the forks into the pallet openings will not bring about stringer splitting and rupture of the joints between the stringers and the deckboards.

In view of the foregoing, it will be apparent that protective members A endow pallet P with a damage-proof character, rendering the same most economical in usage. Destructive tests made upon pallets of the present invention have shown, beyond any question, that the same can resist repeated forceful impacts, shocks, and the like, without any of the various types of failures so long, heretofore accepted as normal.

Protective members of the type hereinabove discussed may be readily adapted for usage with pallets of all well-known designs. As exemplary thereof, there is disclosed in Figure 4 a pallet 20 having parallel stringers 21, 22 and 23, with upper and lower deckboards 24, 25; said deckboards extending at their ends beyond the stringers, with said pallet 20 being thereby of the single-faced inset-stringer-type. Disposed upon the projecting ends of stringers 21, 22, and 23 in the manner shown hereinabove is a protective member B comprising a tube 26 supported by three U-shaped brackets 27, 28 and 29, said brackets being identical with brackets 7, 8 and 9 hereinabove discussed. Tube 26 projects at its ends beyond the end brackets 27, 29 to provide end sections 26', 26'' for spaced disposition from the portions of the adjacent deckboard which extend beyond stringers 21, 22. Thus, protective member B is in all respects similar to protective member A, but is provided with end portions for accommodating the extended portions of the deckboards. Said tube 26 is welded or otherwise secured to the extensions of the outer arms of brackets 27, 29 and passes freely through openings provided in the inner extensions of said brackets as well as those of the center bracket 28.

In Figure 5, 30 generally designates a reversible or double-faced flush-type stringer pallet incorporating parallel stringers 31, 32, 33 and upper and lower deckboards 34, 35, respectively, with the end deckboards 34', 35' of said upper and lower decks respectively being spaced

from the ends of stringers 31, 32, 33. Disposed upon the end portions of pallet 30 is a protective member C, which comprises a pair of parallel tubes 36, 36' which are respectively presented adjacent the end edges of upper deckboard 34' and lower deckboard 35'. Said tubes 36, 36' are disposed respectively above and below the ends of stringers 31, 32, 33 and are supported in position by brackets 37, 38, 39; each of said brackets comprising a pair of parallel arms 40, 41 which are secured, as by nails, to the opposite side faces of stringers 31, 32, 33 in their projecting end portions. The arms 40, 41 of each bracket 37, 38, 39 extend at both of their ends beyond the related stringer so as to provide extensions as at 42. Said extensions 42 may be rounded in their outer ends and in their extreme end portions are substantially aligned with the outwardly presented surface of the adjacent deckboard 34', 35', as the case may be. Tubes 36, 36' at their ends are welded, or otherwise fixed, to the inner faces of the extensions 42 of the laterally outer arms of brackets 37, 39 and extend freely through openings such as at 43 in the extensions of the laterally inner arms of said end brackets 37, 39 as well as in both arms of center bracket 38, for purposes above outlined in conjunction with protective member A above described. It will thus be seen that tubes 36, 36' are presented in spaced relation to the proximate end deckboards as well as the adjacent surfaces of stringers 31, 32, 33, and protective member C operates in the same manner as protective member A hereinabove set forth, with the exception that both the lower and upper end deckboards of pallet 30 must necessarily be protected since the pallet is reversible.

As Figure 6 reveals, the present invention, if desired, may be readily adapted for usage with reversible or double-faced pallets of the inset stringer type, such as shown at 40, which pallet comprises parallel stringers 41, 42, 43 and upper and lower deckboards 44, 45, respectively. Said deckboards 44, 45 project in their end portions beyond the outer stringers 41, 42, and each deck is, understandably, adapted for load reception. The end deckboards of each deck, namely, 44' and 45', are set inwardly from the proximate ends of the stringers for permitting mounting on the ends of pallets of protective members D which comprise spaced parallel tubes 46, 46' maintained respectively in axial parallel, spaced relationship to the outer end edges of upper end deckboards 44' and lower end deckboards 45'; said tubes being maintained in such position by brackets 47, 48 and 49 which are respectively engaged upon the projecting ends of stringers 41, 43, 42. The elements of protective member D are substantially identical with those of protective element C hereinabove described and are in the same relationship to the deckboards and stringers of their associated pallet, as are those of protective member C. However, tubes 46, 46' project in their end portions beyond the end brackets 47, 49 to provide extensions, as at 46'', for disposition spacedly from but aligned with the end portions of deckboards 44', 45' which extend beyond stringers 41, 42, so that said deckboards are shielded throughout their longitudinally exposed side.

Figure 7 discloses a pallet 50 of the so-called "flush-block" type having a plurality of spaced block members as 51, 52, 53, which have secured upon their upper surfaces portions of flat stringers 54 for connecting the blocks into a unitary base structure, with upper deckboards 55 being mounted upon the stringers and extending transversely thereof; said deckboards 55 being spaced from the proximate ends of the adjacent blocks and stringers. On their under surface blocks 51, 52, 53 are interconnected by a plurality of spaced transverse members 57; it being recognized that the deckboards 55 provide the surface for load reception.

Mounted on each end of pallet 50 is a protective member E which is substantially identical with protective member A hereinabove described in that it incorporates an elongated tube 6' and U-shaped brackets 7', 8', and 9' which respectively are mounted upon the projecting end portions of blocks 51, 53, 52, respectively, together with the portions of stringers 54 thereon. Thus, protective member E operates in the same manner as protective member A above described.

In view of the foregoing, it is to be observed that protective members of the present invention may be easily adapted for usage upon pallets of any construction or design without in any way diminishing their effectiveness in usage. It will be further noted that although protective members of this invention may be preferably incorporated during the manufacture of pallets, the same can be simply and expeditiously mounted upon pallets which are already in use without requiring any extensive modification of the pallet or necessitating the utilization of highly skilled labor.

Also of immediate importance is the fact that the protective members of the present invention act to prevent ripping of the end boards from the stringers through the lifting forces acting thereon by steel straps or other banding members utilized for securing loads upon pallets. It is customary to prevent displacement of loads during shipping to thread steel straps longitudinally through the openings between the stringers and upwardly about the load while other straps are fed through openings in the face of the stringers and extend transversely of the pallet, beneath the upper deckboards and thence upwardly about the load. These straps must necessarily be secured under considerable force so as to resist any gravitational effects from the load and hence will, perforce, exert an upwardly directed pressure against the end deckboards, which pressure is of sufficient extent to cause the boards to be broken or pried off, with resultant costly damage to the pallet as well as reducing considerably the securement of the load. It will thus be seen that the elongated tubular members of the protective devices of this invention will be engaged by the straps, thereby relieving the end boards of any engagement whatever with such straps, while the pressure of said straps will be transmitted to the supporting brackets and thence through the stringers.

The inset-stringer-type pallets have been generally referred to in the industry as a "stevedore" type pallet, since the same, through their unique design, are especially adapted for transportability by cargo slings, which are widely used in industry for moving loaded pallets from one location to another. Such slings will, similar to strapping and other banding means, cause an undue upward lifting force to be exerted upon the end boards with fracturing or complete breakage of the end boards under such force being a most frequent occurrence. Thus, the protective members of the present invention will serve to shield the end boards against engagement with any portions of cargo slings, and particularly at the corners where the "biting" engagement is normally effected between the slings and the pallets. Therefore, the portions of the elongated tubular members extending beyond the end brackets as shown in pallets 20 and 40 hereinabove described, such as 26' and 46'', respectively, receive the force of the sling, which force is dispersed throughout the protective member and the stringers.

It should be understood that changes and modifications in the formation, construction, arrangement, and combination of the several parts of the pallet construction may be made and substituted for these herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A pallet comprising spaced, parallel stringers, a plurality of deck boards disposed transversely of the stringers, at least one end deck board being spaced from the proximate ends of said stringers, and a protective device mounted at least at one end of said pallet comprising a plurality of brackets, each engaging a stringer on its op-

posite side faces in its projecting end portion, and a rigid elongated member in axial parallel relation to the deckboards and extending transversely of the stringers, said member being engaged by said brackets for fixed support thereby in spaced relation to the adjacent end deckboard and to the stringers.

2. A pallet comprising spaced, parallel stringers, a plurality of deckboards disposed transversely of the stringers, the end deckboards being spaced from the proximate ends of said stringers, and a protective device mounted at each end of said pallet comprising a plurality of brackets, each bracket embracingly engaging a stringer on its opposite side faces in its projecting end portion and having portions extending beyond the related stringer, and a rigid elongated member in axial parallel relation to the deckboards and engaged by said bracket extending portions for fixed support thereby in spaced relation to the adjacent end deckboard and inwardly of the ends of said stringers.

3. A pallet as described in claim 2 wherein said elongated member is fixed to the outer bracket extending portion of the outermost bracket, with the other bracket extending portions being adapted for relative adjustable movement longitudinally of the elongated member.

4. A pallet comprising spaced, parallel stringers, a plurality of deckboards disposed transversely of the stringers, the end deckboards being spaced from the proximate ends of said stringers, and a protective device mounted at each end of said pallet comprising a plurality of brackets, each bracket being of U-shape having a pair of spaced, parallel arms and a connecting web for flatwise disposition against opposite side faces and the under surface, respectively of a stringer in its projecting end portion, the arms of each bracket extending beyond the upper surface of the related stringers, and a rigid elongated member engaged by said brackets in their extended portions for fixed support thereby in upwardly spaced relation to the upper edge surface of the proximate stringers and spacedly, endwise of the pallet, from the adjacent end deckboard.

5. A pallet as described in claim 4 wherein the extremities of the bracket extended portions are substantially aligned with the load-receiving surface of the deckboards, and the elongated member is of tubular construction.

6. A pallet as described in claim 4 wherein the stringers are set inwardly from the ends of the deckboards, and the elongated member is of tubular construction and extends in its end portions beyond the brackets of the outermost stringers.

7. A reversible, double-faced pallet comprising spaced, parallel stringers, a plurality of deckboards transversely of the stringers and secured upon opposite edges of said stringers to define a pair of load-receiving surfaces, the

end deckboards at each end of each surface being spaced from the proximate end of the stringers, and a protective device mounted at each end of the pallet, each protective device comprising a plurality of brackets, each bracket being secured upon a stringer in its projecting end portion and on its opposite side faces and extending beyond the upper and lower edges of the related stringer, and a pair of rigid, parallel elongated members of tubular stock engaged by the upper and lower extended portions of the brackets for fixed support thereby in spaced, axial parallel relation to the proximate deckboard and to the adjacent edge surface of the stringers.

8. A pallet as described in claim 7 wherein the elongated members are substantially co-extensive with the deckboards, and the extremities of the extended portions of the bracket are aligned with the load-receiving surface of the adjacent deckboard.

9. A pallet as described in claim 7 wherein the stringers are set inwardly from the ends of the deckboards, and the elongated members project in their end portions beyond the outermost brackets in spaced relation to the end sections of the deckboards.

10. A pallet comprising a pair of side stringers and a center stringer, said stringers being in spaced parallel relation, a plurality of deckboards disposed transversely of the stringers to provide a load-receiving surface, the end deckboards being spaced from the proximate ends of said stringers, and a protective device mounted at each end of said pallet comprising brackets corresponding in number to the number of stringers, each bracket having flat side arm portions secured upon opposite sides of the related stringer, said bracket arm portions extending beyond the associated stringer in alignment with the adjacent deckboards, the extending portions of said arms of said brackets being aligned, a rigid elongated member extending transversely of the pallet in axial parallel relation to the deckboards and being engaged by the extended portions of said bracket arms whereby said member is supported at its ends by the brackets on the side stringers and at its central portion by the bracket on the center stringer, said brackets fixedly maintaining said elongated member in spaced relation, endwise of the pallet, from the adjacent deckboard and spacedly from the related stringers.

References Cited in the file of this patent

UNITED STATES PATENTS

1,580,146	McCausland	Apr. 13, 1926
2,297,347	Cruickshank	Sept. 29, 1942
2,450,432	Lehrman	Oct. 5, 1948