

Dec. 24, 1957

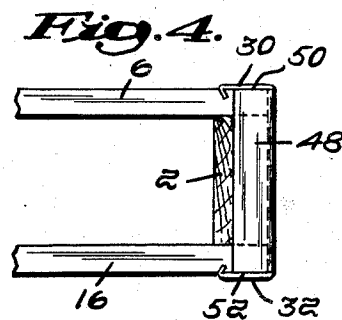
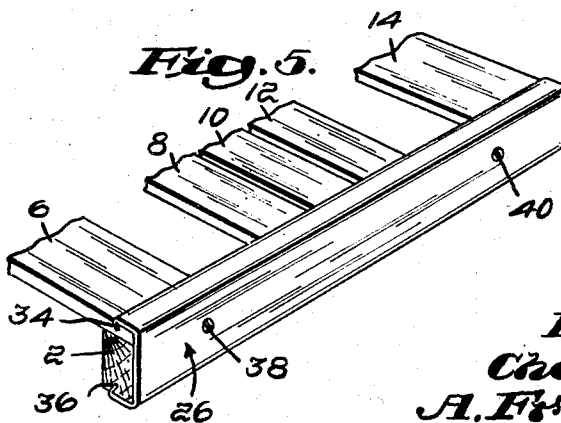
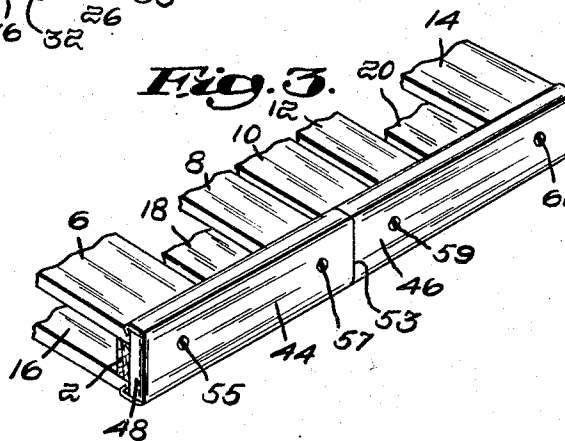
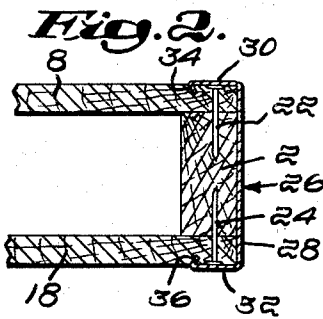
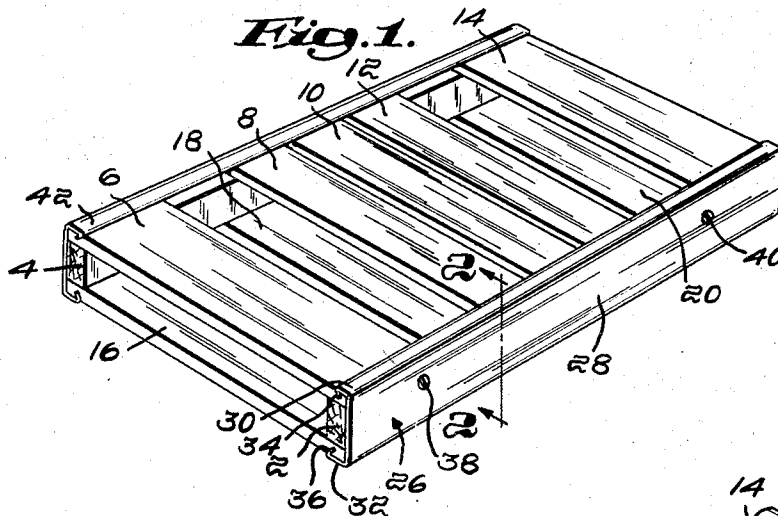
C. S. WHITE ET AL

2,817,485

PALLETS

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 6.

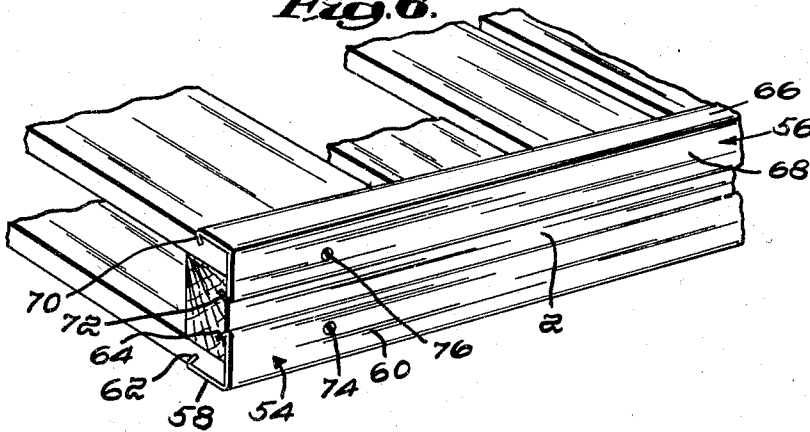


Fig. 7.

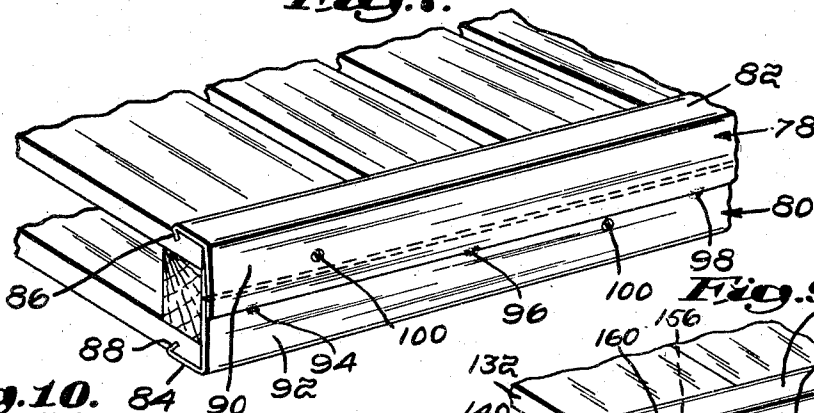


Fig. 9.

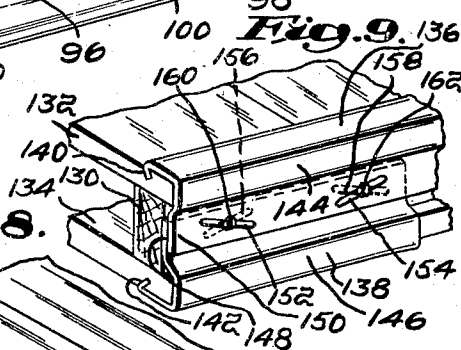
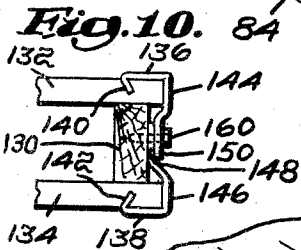
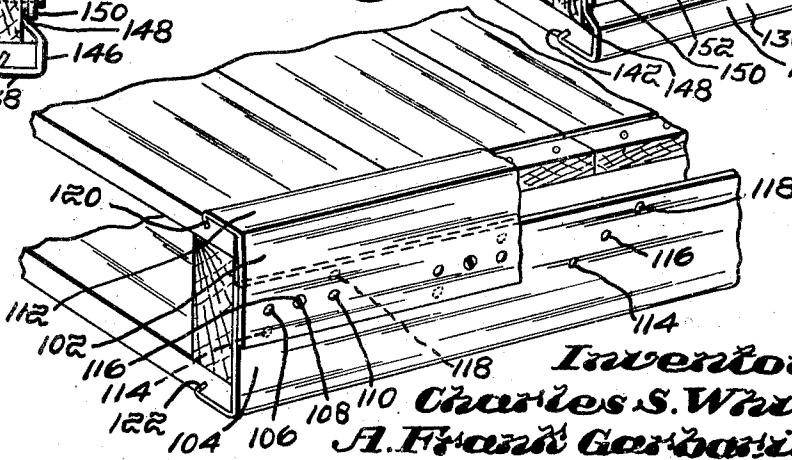


Fig. 8.



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1

2,817,485

PALLETS

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8 Claims. (Cl. 248—120)

This invention relates to an improvement in pallets of the type that are used with lift trucks.

As is well known in the material handling field, it is customary today to move all kinds of products in factories, warehouses, docks and elsewhere by means of lift trucks. The merchandise or material is first placed on a device known as a pallet which in effect is a low raised platform of sufficient height to enable the lift truck to be positioned thereunder. Upon operation of the lift truck, the pallet and the goods thereon will be raised a short distance above the floor, to permit the lift truck to move to the new desired location at which point the lift truck is lowered to deposit the pallet and material in the new position.

In a typical factory or warehouse, hundreds of pallets may be in use with goods constantly being piled thereon and removed therefrom. As a result, the pallets are subjected to continuous, rigorous use. Because of the large number of pallets that may be in use in any given installation, the cost of the pallets is a material factor. Hence, there has been a continuous compromise between cost and quality.

The usual pallet construction consists of a pair of parallel stringers, usually two by fours, across which are nailed a series of one inch boards usually spaced apart. There are single faced pallets in which the cross boards are applied to the upper faces of the stringers only and there are also double faced pallets in which the cross boards are applied to both the upper and lower faces of the stringers. In the double faced pallets, if used with hand lift trucks, it is necessary that the cross boards be spaced apart sufficiently near the edges so that when the wheels of the lift truck come into operation to raise the pallet, there will be a space between the boards to permit such action.

The usual construction of the pallets involves the simplest construction procedures, namely, the nailing of each of the cross boards to the parallel stringers. Experience has shown that after a short period of normal use, the warping and twisting of the pallet as it is raised and moved by the lift truck causes the nails to pull out slightly, raising the heads of the nails above the surfaces of the cross boards. These heads then catch on the goods causing damage while at the same time the pallet construction becomes weaker. The continued warping and twisting of the pallet after the nails have started to loosen causes even more rapid deterioration, including splitting of the cross boards. Thus, after a relatively short life, the pallet must be discarded or completely rebuilt.

Accordingly, it is an object of the present invention to overcome the deficiencies of the pallets known to the prior art and this is accomplished by the invention which will be described hereinafter and which achieves the following beneficial results in an economical manner. (1) The rigidity of the pallet is greatly increased. (2) The securing nails can no longer begin to pull out. (3) The securing nails are covered by a structural sheathing so

2

that damage to the merchandise from the nail heads is completely eliminated. (4) The invention is applicable to pallets of varying dimensions. (5) The metal structural members can be reused should the wood portions of the pallet be damaged beyond further use, and (6) damaged boards can be replaced.

The nature of the invention will be more clearly understood by reference to the following description and the accompanying drawings in which

Fig. 1 is a perspective view of a two-faced pallet incorporating the invention.

Fig. 2 is an enlarged cross sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a perspective fragmentary view similar to Fig. 1 showing a modified form of the invention in which the supporting and reinforcing channels have closed ends.

Fig. 4 is an enlarged view in elevation of the left end of Fig. 3.

Fig. 5 is a perspective fragmentary view of a single faced panel incorporating the invention.

Fig. 6 is a perspective fragmentary view of one corner of a pallet showing still another modification.

Fig. 7 is a fragmentary perspective view of a corner of a pallet showing still another modification.

Fig. 8 is a fragmentary perspective view of one corner of another type of pallet showing a further modification.

Fig. 9 is a fragmentary perspective view of one corner of another type of construction involving a modification of that shown in Fig. 8.

Fig. 10 is a fragmentary end view of Fig. 9.

It will be understood that pallets are made in various dimensions in which the horizontal dimensions may be for example, 32 by 48 inches or 48 by 48 inches. The overall vertical dimension of a pallet may be in the order of 5½ inches consisting of one inch upper and lower planking (¾ inch finished) secured to the narrow faces of parallel two by fours (3¼ inches finished).

Regardless, however, of the pallet dimensions the present invention in one or more of its forms is applicable.

Referring to Fig. 1 in which is shown a typical double faced pallet, it will be seen that the unit consists of two parallel members 2 and 4 to the tops of which are nailed a plurality of boards of suitable width, 6, 8, 10, 12 and 14. To the bottom of the parallel members 2 and 4 are nailed a similar group of boards, 16, 18 and 20 and two other boards, obscured in this view, corresponding to the upper boards 10 and 12. The nature in which the boards 8 and 18 are secured to parallel member 2 is shown in Fig. 2. Herein the nails 22 and 24 are indicative of the arrangement of the nails used in securing all of the upper and lower boards.

As explained above the nails 22 and 24 after a period of use begin to work loose and their heads rise above the surfaces of the boards 8 and 18, thus becoming instruments of potential damage to merchandise and material that may be piled on the pallets thereafter. Therefore, to prevent the escape of the nails and to strengthen the pallet against torsion and breakage, I have applied novel means in the form of a channel iron 26 which comprises a vertical wall 28, a top horizontal surface 30, a lower horizontal surface 32 and the partially doubled back flanges 34 and 36.

In order to apply the channel 26 to the pallet in accordance with the invention, it is necessary to cut longitudinally extending diagonally sloping grooves in the upper surfaces of the upper boards and the lower surfaces of the under boards in the manner shown in Fig. 2. Thus, grooves may be conveniently formed by passing the unit, while held at an angle, under a power saw. In order to apply the channel properly, it is necessary that the dimensions of all of the parts of the channel and

3

pallet be accurately controlled, but if this is done, the channel may then be slid onto the pallet endwise with the partially turned back flanges 34 and 36 sliding in the corresponding grooves and the side 28, top 30 and bottom 32 sliding along the corresponding surfaces of the upper and lower boards and the outer wall of the longitudinal member 2. When the channel has been slid to its proper position as shown in Fig. 1, it may be permanently secured thereto by the introduction of two or more screws 33 and 40. With the channel longitudinally secured it is believed obvious that it otherwise cannot escape from its position as the flanges 34 and 36 are of sufficient length and angularity to remain secure in the grooves. The upper and lower channel surfaces 30 and 32 closely cover the heads of all the nails securing the cross boards and any subsequent escape or working loose of the nails is prevented.

With the first channel in place, a second corresponding channel 42 is then applied to the opposite side of the pallet in the manner heretofore described and the unit is then complete and ready for use.

The channel will ordinarily be formed of sheet metal that may be in the order of $\frac{1}{16}$ of an inch thick which has been found of adequate strength. The slight resulting increase in vertical dimension of the pallet at the channel sections has no effect on the normal use and operation of the pallet.

It is believed clear from this description that a conventional pallet may be greatly strengthened and its life materially increased through the addition of the channel members made accordingly to the instructions disclosed herein. With the broad aspects of the invention in mind, other alternative species will now be explained.

In Fig. 3 the channel is made in two parts, 44 and 46, each of which has a closed end. One of the closed ends is illustrated at 48 in Figs. 3 and 4. The closed end may take the form of a piece of metal integral with the channel which has been folded over at the channel end and welded to the top 30 at 50 and the bottom 32 at 52. Obviously, with the closed ends it becomes necessary to make the channel in two halves, each of which is slid into place from one end of the pallet. By cutting the channel portions to proper length, they can be made to abut as at 53 after which they may be secured by the screws 55, 57, 59 and 61. This construction gives somewhat added protection to the pallet ends although, being in two parts, it may be a trifle weaker at the center. However, the nails are prevented from escaping and the general rigidity of the unit will be substantially the same as that of the structure disclosed in Fig. 1.

A single faced pallet construction is shown in Fig. 5. This differs from Fig. 1 only in that the bottom boards are omitted. Accordingly, when the channel 26 is used with this form, it will be made appropriately narrower and the lower groove into which fits the reversely turned flange 36 will be made in the lower surface of the member 2. After channel 26 has been slid to place with respect to the pallet shown in Fig. 5, it may be secured by the addition of the screws 38 and 40.

In some instances, it will be found that the pallets have been made to odd dimensions in the vertical direction in which case it may not be practical to use a one piece channel as shown in Figs. 1 to 5. That is to say, the vertical dimension of the pallet may be such that a standard preformed single channel would not fit snugly. To meet these unusual conditions, we have provided the channels shown in Figs. 6, 7 and 8 which may be used with pallets having varying vertical dimensions.

Referring to Fig. 6 the invention contemplates the use of two channels 54 and 56. Channel 54 has a lower horizontal surface 58, a vertical surface 60 and two intumed flanges 62 and 64. Likewise, channel 56 has a top horizontal surface 66, a vertical surface 68 and two intumed flanges 70 and 72. These right angled elements

4

can be made to standard dimensions and corresponding grooves can be cut in the upper and lower planks and the side of the longitudinal member 2 at proper positions so that each of the two channels 54 and 56 may be slid into position endwise and thereafter secured by the screws 74 and 76. A similar pair of channels will be applied to the opposite side of the pallet.

It is believed apparent from this construction that the nail heads securing the upper and lower boards to the longitudinal members 2 and 4 will be located under the upper and lower surfaces of the two channels and the pallet will be given substantially the same rigidity in this case as is obtained by the construction of Fig. 1.

Another alternative construction is shown in Fig. 7. This arrangement may be used when welding equipment is available and where the dimensions of the pallet are such that channels of standard dimensions cannot be used. Here, the channel comprises two parts, an upper part 78 and a lower part 80, having the usual horizontal portions 82 and 84 and the doubled back flanges 86 and 88 designed to fit in corresponding grooves in the upper and lower planks. These grooves, of course, are so positioned that they will receive the intumed flanges in such manner that the vertical surfaces 90 and 92 will lie closely against the vertical side face of member 2. The dimensions of the portions 78 and 80 are such that there will be an overlap of the faces 90 and 92 as shown. With the parts installed to this extent, the two portions 78 and 80 may then be placed in a clamp, squeezing them toward each other so as to exert substantial pressure on the included pallet. Spot welds may then be applied as at 94, 96 and 98 to hold parts 78 and 80 in the position shown and longitudinal movement of the completed channel may then be insured against by the addition of one or more screws 100.

Another species is shown in Fig. 8. This construction is much like that shown in Fig. 7 with the exception that the welding procedure is not used to maintain the two portions 102 and 104 together. Instead, these two parts are secured by screws which pass through suitably aligned holes. Since the two parts 102 and 104 may be used with a pallet whose dimensions at the outset may be unknown, we have found it expedient to provide in the member 102 a series of screw holes 106, 108 and 110 which run parallel to the upper face 112 of the channel. The lower portion of the channel 104 has another series of screw holes which run in a sloping direction as at 114, 116 and 118. Similarly disposed across the entire length of the two channel elements are other series of holes spaced in like manner. When the two portions have been placed on the pallet with the reversely turned flanges 120 and 122 positioned in the corresponding grooves and the two portions have been clamped together to bring pressure on the top and bottom of the pallet boards, it will be found that certain of the holes in the two parts will be aligned. In the instance shown, the hole 108 in the upper section is aligned with hole 116 of the lower section, thus permitting the insertion of a screw which prevents the separation of the two portions vertically and also prevents their movement longitudinally. Thus, in effect, the same result is obtained in the construction of Fig. 8 as that shown in Fig. 7 with this exception, that should it be desired to reuse the channel portions, those shown in Fig. 8 may be made available by the mere removal of the securing screws, whereas in Fig. 7 the welded portion must be broken.

Another modification is shown in Figs. 9 and 10. In principle, this construction is the same as that shown in Fig. 9, modified in a manner that facilitates installation of the two part channels.

In Figs. 9 and 10, the stringer 130 is set in slightly from the ends of the upper and lower boards 132 and 134. The channel consists of two parts, the upper part being 136 and the lower 138. Each part of the channel has its reversely turned flange, 140 and 142, positioned

5

in suitable grooves in boards 132 and 134. The grooves are so located with respect to the ends of the boards that the vertical portions of the parts 136 and 138 rest closely against the ends of the boards as at 144 and 146.

The vertical portions of the two parts of the channel overlap as at 148 and 150 and each of these overlapping parts has cut therein elongated slots which slope slightly in opposite directions. The slots in portion 136 are numbered 152 and 154 while the slots in portion 138 are numbered 156 and 158. Additional similar slots will be provided throughout the length of the channel and there will be enough slots to provide a proper number of screws to secure the parts adequately.

If desired, in those cases where the pallet has bottom cross boards only at the front and back thereof, the full length lower channel can be changed to two shorter individual channels of which channel 138 is representative. The length of the channels is immaterial so far as the securing, strengthening and protective principles are concerned.

After the flanges 140 and 142 have been placed in their respective grooves, the two parts of the channel are then placed in a clamp or vise and forced toward each other to the maximum extent. Lag screws 160 and 162 are then inserted where the crossing slots overlap to secure the two halves of the channel in tightly engaged reinforcing position. The slope of the slots in each part is varied so there will be no tendency of either part to shift position endwise.

Since the stringer 130 is set back from the ends of the boards 132 and 134 as shown in Figs. 9 and 10, the overlapping portions 148 and 150 will be forced and held inwardly by the screws as shown in Fig. 10, and the outer end of each screw head will be in a position where it will be about flush with a vertical line running between the outer edges 144 and 146. This will prevent the screw heads of abutting pallets from catching on each other or on other passing articles. The bent-in position of the overlapping portions 148 and 150 gives an additional tightening effect, thus securing the two parts more firmly. It will be understood, however, that the channel construction of Figs. 9 and 10 may also be used with the pallet construction of Figs. 1 to 8.

The affixing of the boards to the stringers by nails also includes the use of screws or bolts as an equivalent securing means.

Where the term "vertical portion" is used in the claims with respect to that part of the channel that is against the side of the pallet, it is intended to include all forms shown in the drawings even though in the overlapping constructions shown in Figs. 7, 8, 9 and 10, the side portions are only approximately or in part vertical.

It is our intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

We claim:

1. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks, nails securing the ends of said planks to said stringers, said planks having aligned sloping transversely extending grooves in their upper surfaces near the ends thereof, said grooves extending parallel to said stringers, preformed bracing members for supporting said planks with each stringer, each said bracing member comprising a flat upper portion overlying one end of each of said planks and nails, a reversely turned flange on the edge of said upper portion positioned in said grooves, a vertical portion lying against the face of the stringer and means for maintaining said bracing member in the position aforesaid.

2. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks, nails securing the ends of said planks to said stringers, said planks having aligned sloping transversely extending grooves in their upper surfaces near the ends thereof, said grooves extending par-

6

allel to said stringers, a preformed metallic bracing member comprising an upper portion overlying said one end of said planks and nails, a flange on the edge of said upper portion positioned in the grooves at said one end of said planks, a vertical portion of said bracing member lying against the side of the stringer at said one end of said planks, a lower portion of said bracing member lying under said stringer and means for securing said bracing member in position.

3. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks, nails securing each of said planks to said stringers, said planks having aligned sloping transversely extending grooves in their upper surfaces near the ends thereof, said grooves extending parallel to said stringers, a preformed bracing member for supporting said planks with each stringer, said bracing member comprising a flat upper portion overlying one end of each of said planks and the nails therein, a reversely turned flange on the edge of said upper portion positioned in one of said grooves, a vertical portion connected to said upper portion lying against the face of the stringer, and a second flange parallel to said first reversely turned flange connected to said vertical portion, and a sloping groove in said stringer in which is positioned the said second flange.

4. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks on the top and bottom of said stringers, nails securing the ends of said planks to said stringers, said top and bottom planks having grooves in their top and bottom surfaces respectively, said grooves extending transversely of said planks and parallel to said stringers, a pair of preformed bracing members each in the form of a channel having a vertical portion, upper and lower flat horizontal portions and reversely turned flanges at the edges of said horizontal portions, said flanges being positioned in said top and bottom grooves, said horizontal portions overlying the heads of said nails thereby to prevent the outward movement of said nails and to provide rigidity to said pallet, and means for preventing the longitudinal movement of said bracing members with respect to said pallet.

5. A pallet comprising a pair of parallel stringers, a plurality of top and bottom crosswise planks, nails securing said planks to said stringers, said top and bottom planks each having two grooves in their top and bottom surfaces respectively near the ends thereof, said grooves extending transversely of said planks and parallel to said stringers, a bracing member for each stringer, each bracing member being in the form of a two-piece channel having overlapping vertical side portions, top and bottom horizontal portions and intumed flanges at the edges of said top and bottom horizontal portions, said flanges being positioned in said grooves with said top and bottom portions and said overlapping vertical side portions lying closely against the corresponding portions of said planks and stringer, each of said overlapping vertical side portions having a plurality of slots formed therein with the slots in one overlapping portion being in crossing relation with the slots in the other overlapping portion and means extending through said crossing slots into the said stringer to secure said two overlapping portions with respect to each other and to hold said overlapping portions with respect to the vertical side of said stringer.

6. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks, nails securing said planks to said stringers, said planks having grooves in their surfaces near the ends thereof, said grooves extending transversely of said planks and parallel to said stringers, a bracing member for each stringer, each bracing member being in the form of a two-piece channel having overlapping vertical side portions, top and bottom horizontal portions and intumed flanges at the edges of said top and bottom horizontal portions, said flanges being positioned in said grooves with said top and bottom horizontal por-

7

tions and said overlapping vertical side portions lying closely against the corresponding portions of said planks and stringer, each of said overlapping vertical side portions having a plurality of slots formed therein with the slots in one overlapping portion being in crossing relation with the slots in the other overlapping portion and means extending through said crossing slots into the said stringer to secure said two overlapping portions with respect to each other and to hold said overlapping portions with respect to the vertical side of said stringer.

7. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks on the top and bottom of said stringers, nails securing said planks to said stringers, said top planks having aligned grooves in their top surfaces, said bottom planks having aligned grooves in their bottom surfaces, said grooves in said top and bottom planks running transversely of said planks and parallel to said stringers, a bracing member for each stringer in the form of a channel having a vertical portion, upper and lower horizontal portions and reversely turned flanges at the edges of said horizontal portions, said flanges being positioned in said top and bottom grooves, said horizontal portions overlying the heads of said nails thereby to prevent the outward movement of said nails and to provide rigidity to said pallet, each said channel comprising two sections each slideable into position from opposite ends of said pallet, means integral with each section for covering the ends of said stringers, and means for preventing the longitudinal movement of said channels with respect to said pallet.

8

8. A pallet comprising a pair of parallel stringers, a plurality of crosswise planks on the top and bottom of said stringers, nails securing said planks to said stringers, said top and bottom planks having grooves in their top and bottom surfaces respectively, all of said grooves running transversely of said planks and parallel to said stringers, a pair of bracing members each in the form of a channel, each of said members comprising two sections, each of said sections having a horizontal portion provided with a reversely turned edge flange and a vertical portion, said edge flanges being positioned in said top and bottom grooves and said horizontal portions overlying the heads of said nails thereby to prevent the outward movement of said nails and to provide rigidity to said pallets, the vertical portions of said two sections overlapping longitudinally along the vertical side of said stringers, and means for securing said vertical portions in overlapped position while engaging said pallet tightly.

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