

Dec. 9, 1947.

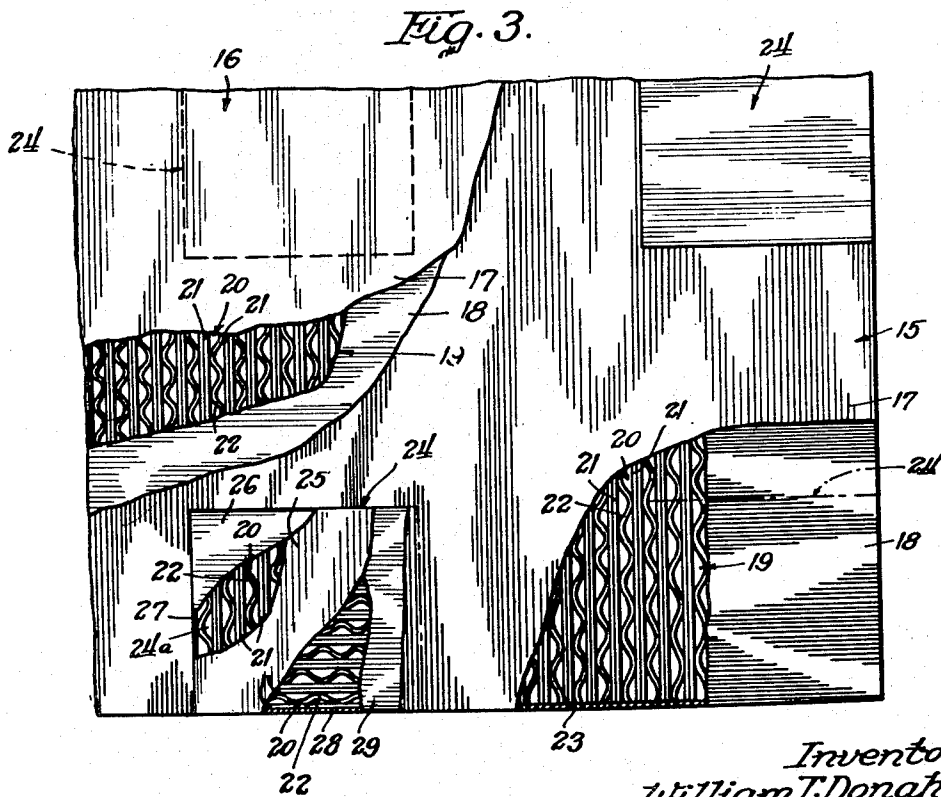
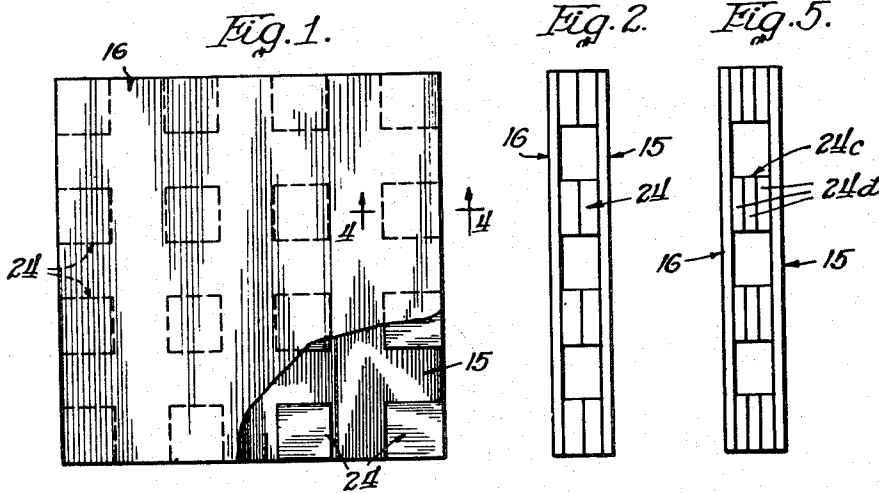
W. T. DONAHUE

2,432,295

PALLET

Filed Dec. 13, 1945

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4.

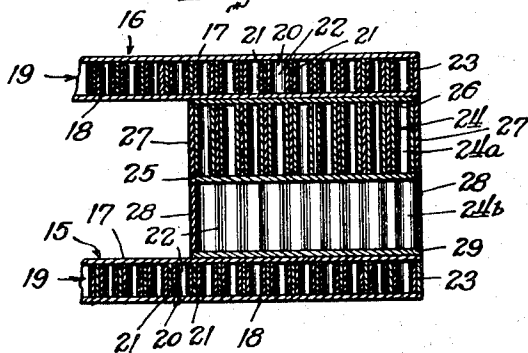


Fig. 6.

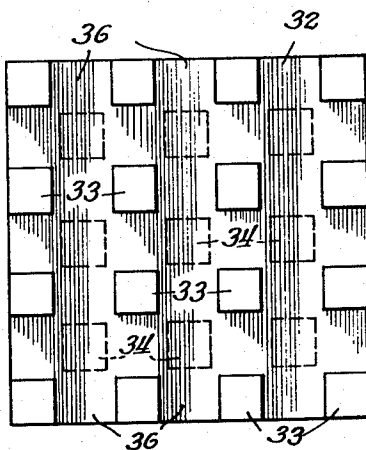


Fig. 8.

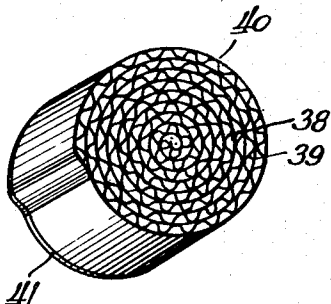


Fig. 7.

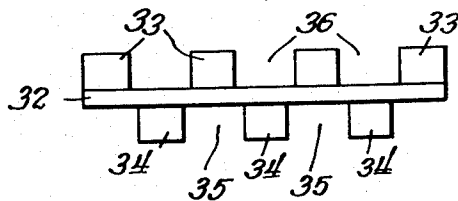


Fig. 9.

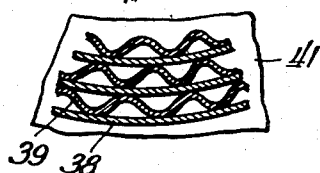


Fig. 10.

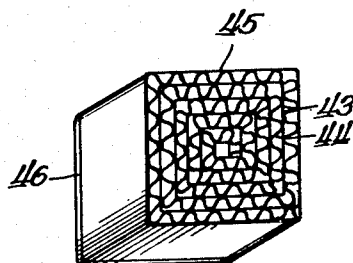
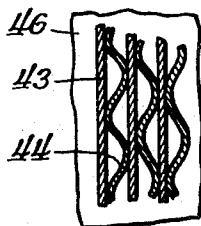


Fig. 11.



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UNITED STATES PATENT OFFICE

2,432,295

PALLET

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8 Claims. (Cl. 248-120)

1

This invention relates to material handling devices, and has to do with a pallet for handling materials in industrial operations.

It is well known, in industrial operations, to stack various materials on pallets and to transfer the stacked materials, either with or without the pallet, by means of fork lift trucks, for storage or shipping purposes. The pallets commonly used at the present are constructed of wood, metal or other comparatively heavy material and, in many cases, are objectionably expensive.

My invention is directed to a pallet of the character stated which is of light weight, may be constructed at relatively small expense, possesses adequate mechanical strength, and may be lifted from any one of four sides by means of a conventional fork lift truck. I have found that ordinary cardboard, properly formed and assembled, may be used to good advantage in constructing pallets of the character stated. While a sheet or strip of cardboard may readily be bent transversely of its plane, such a strip possesses considerable tensile strength and also possesses considerable compressive strength when subjected to edgewise pressure. I have discovered that by using corrugated cardboard, with the corrugations thereof disposed in the direction of the applied pressure, it is possible to construct a pallet having adequate mechanical strength for supporting loads to which such pallets are commonly subjected, and that the mechanical strength of such a pallet may be materially increased by securing together the corrugations thereof by web-like elements effective to restrain the corrugations against spreading apart while also, themselves, being capable of supporting considerable loads. Further objects and advantages of my invention will appear from the detail description.

In the drawings:

Figure 1 is a plan view, partly broken away, of a pallet embodying my invention;

Figure 2 is a side view of the pallet of Figure 1;

Figure 3 is a fragmentary plan view, on a considerably enlarged scale, of the pallet of Figure 1, broken away at different areas thereof to show the interior structure of the pallet and the associated spacer blocks;

Figure 4 is a sectional view, on an enlarged scale, taken substantially on line 4-4 of Figure 1;

Figure 5 is a view similar to Figure 2, but showing a slight modification of the pallet of my invention;

Figure 6 is a plan view of a second modified form of pallet embodying my invention;

Figure 7 is a side view of the pallet of Figure 6;

Figure 8 is a perspective view of a modified form of spacer block which may be used in the pallet of my invention;

2

Figure 9 is a fragmentary detail cross sectional view of the block of Figure 8, on an enlarged scale;

Figure 10 is a perspective view of a second modified form of spacer block which may be used in the pallet of my invention; and

Figure 11 is a fragmentary cross sectional view, on an enlarged scale, of the block of Figure 10.

In Figures 1 to 4, inclusive, I have shown a pallet embodying my invention comprising a base member 15 and a platform 16 spaced apart by blocks 24. It is assumed, for purposes of description, that the pallet is disposed with the member 16 above the member 15, though obviously the pallet may be reversed, in which case the member 15 would become the platform and the member 16 would become the base. The members 15 and 16 are of similar construction, and a description of one thereof will suffice. Member 16, for example, comprises upper and lower sheets 17 and 18, respectively, of cardboard, the cardboard used being commonly termed chip board, which in practice may be approximately $\frac{1}{4}$ of an inch thickness. A corrugated structure 19 is disposed between the sheets 17 and 18, as is shown more clearly in Figures 3 and 4. The structure 19 comprises a plurality of strips or elements 20 of corrugated cardboard, each comprising two uncorrugated strips 21 and a corrugation strip 22 disposed between the strips 21 and secured thereto face to face by a suitable adhesive, as will be explained more fully presently. The elements 20 are disposed on edge vertically, with the corrugations of the strips 22 perpendicular to the sheets 17 and 18 and the uncorrugated strips 21 on edge and also perpendicular to the sheets 17 and 18. The elements 20 are disposed in abutting contact and are secured together face to face by a suitable adhesive, the structure 19 being co-extensive with the sheets 17 and 18, and the edges of member 16 being closed by suitable sealing strips 23 of cardboard, these strips 23 being at two edges of member 16 the uncorrugated strips 21 of the outer elements 20, and at the other two edges of member 16 additional strips of cardboard. As stated, the base member 15 is constructed in the same manner as platform member 16. Any suitable adhesive may be used for securing the various elements together. I have found sodium silicate satisfactory and, in practice, this is applied rather freely so that a substantial amount thereof is absorbed by the cardboard elements and imparts desired stiffening thereto, though that is not essential to my invention. I also contemplate impregnating the cardboard elements of the members 15 and 16 with a suitable thermosetting plastic or resin, or other substance of similar character, which will serve as an adhesive and, when subjected to heat, under slight pressure sufficient to hold the

parts in contact without objectionable distortion thereof, will set, producing a rigid structure the various elements of which are effectively bonded together. It may be preferable however, in many cases, not to impregnate the cardboard with a resin or like substance, since the unimpregnated cardboard possesses suitable strength and will yield without breaking under a blow, rendering it more suitable for use than the impregnated cardboard under conditions where the pallet is apt to be subjected to blows.

The spacer blocks 24 are constructed, in general, similarly to the members 15 and 16. As is shown more clearly in Figures 3 and 4, the spacer blocks each comprise an upper section 24a and a lower section 24b secured to an intervening sheet of cardboard 25. Upper section 24a of block 24 comprises a plurality of units or strips 20 of corrugated cardboard similar to the strips of the corrugated structure 19 of platform member 16, these strips or elements 20 being secured together face to face by a suitable adhesive, the upper end of section 24a being closed by a sheet 26 of cardboard adhesively secured to the interior corrugated cardboard structure and to sheet 18 of platform 16. The edges of section 24a of block 24 are closed by sealing strips 27 of cardboard adhesively secured to the corrugated structure and to sheets 25 and 26. Lower section 24b of block 24 is constructed similarly to the upper section 24a, being provided with cardboard sealing strips 28 at its edges and, at its lower end, with a sheet of cardboard 29 adhesively secured to the interior corrugated structure and to the upper sheet of base member 15. It will be noted that the corrugated elements 20 of the upper section 24a of block 24 are disposed at right angles to the corrugated elements 20 of the lower section 24b, which is conducive to increased mechanical strength, whereby the compressive strength of the block is increased so that this block is capable of sustaining greater loads than it would sustain if the elements 20 of both of the sections 24a and 24b of block 24 were similarly disposed. In that connection it will be remembered that all of the parts of the block are adhesively secured together and mutually reinforce each other.

As is shown more clearly in Figures 1 and 2, the spacer blocks 24 are disposed in parallel spaced rows which define between them, at each edge or side of the pallet, three parallel passages adapted for reception of the forks of a fork lift truck, by means of which the pallet and the material thereon may be lifted and transported to a desired location, in a known manner.

In the corrugated structures, in the members 15 and 16 and in the blocks 24, the corrugations of the cardboard provide vertically disposed columns of considerable compressive strength capable of supporting heavy loads. In addition, the uncorrugated strips of the elements 20 also provide vertical elements capable of sustaining considerable loads and, in addition, serve to tie together the corrugations in such manner as to prevent spreading thereof, whereby the compressive strength of the structure as a whole is materially increased. The uncorrugated strips also provide areas of contact of considerable extent between the elements 20 whereby these elements are effectively secured together adhesively, as above noted, which is conducive to increased strength of the corrugated structure as a whole.

The modified form of pallet shown in Figure 5 is similar to that of Figures 1 to 4, inclusive, ex-

cept that the spacer blocks 24c are formed in three sections 24d, which may be preferable in certain cases, particularly where the pallet is intended to carry exceptionally heavy loads. By forming the blocks 24c in three sections 24d, the vertically disposed corrugated elements of these blocks are somewhat shorter than the corresponding elements in the blocks 24 of Figures 1 and 2, and are tied together at their ends by the intervening sheets of cardboard, which reduces any tendency of such corrugated elements to spread or crumple under load, the blocks 24c possessing somewhat greater compressive strength than the blocks 24 of Figure 2. Otherwise the pallet of Figure 5 is like that of Figures 1 and 2 and need not be described in greater detail.

The modified form of pallet shown in Figures 6 and 7 comprises a platform 32 having secured to one face thereof a plurality of supporting blocks 33 disposed in spaced parallel rows, and, at its other face, a plurality of similar blocks 34 also disposed in spaced parallel rows. It will be noted that the rows of the blocks at one face of platform 32 are staggered relative to those at the opposite face, so that a row of blocks 33, for example, overlies a space or passage 35 between two adjacent rows of blocks 34 at the under face of platform 32, and the rows of blocks 34 underlie the spaces or passages 36 between the rows of blocks 33 at the upper side or face of the platform. In use, this pallet of Figures 6 and 7 is supported by either the blocks 33 or the blocks 34, and the material being handled is stacked on the blocks at the opposite side of the platform 32. Assuming that the pallet is supported by blocks 34, the material will be stacked upon the blocks 33. If it is desired to move the stack of material without the pallet, the forks of the lift truck may be inserted between the rows of blocks 33 for that purpose. If on the other hand it is desired to lift the pallet with the stack of material, the forks of the truck may be inserted through the passages 35, the load being transmitted to the forks of the lift truck through the blocks 33, it being assumed that the lift truck has four forks, that is, a fork with four tines or blades for passing beneath platform 32 between and along the rows of blocks 34. While the blocks 33 and 34 are shown as being formed as single units, they may be formed in two or more sections, in substantially the same manner as in Figure 2 or Figure 5, if desired.

In the pallets so far described, the corrugated structures are formed of parallel strips or elements secured together face to face. They may be otherwise formed, within the broader aspects of my invention. In Figure 8 I have shown a single strip of corrugated cardboard, comprising an uncorrugated strip of cardboard 38 and a corrugated strip 39 adhesively secured to one face of strip 38, the composite strip 38-39 being wound spirally upon itself to provide a cylindrical block 40. Preferably, block 40 is closed at each end by a sheet of cardboard 41 adhesively secured thereto. This block 40 may be substituted for the spacer blocks 24 of the pallet of Figures 1 and 2, for the spacer blocks 24c of the pallet of Figure 5, or for the blocks 33 and 34 of the pallet of Figures 6 and 7, being in each instance disposed with the corrugations thereof perpendicular to the platform, or the platform and the base member, of the pallet. Obviously, if desired, the block 40 may be formed in two or more sections. Also, if desired, the corrugated interior structure of the platform and the base

5

member, when used, of the pallet, may be formed in major portion in the same manner as the block 40 of Figure 8, as will be readily understood.

In Figures 10 and 11, I have shown a second modified form of corrugated structure produced from a strip of corrugated cardboard, comprising an uncorrugated strip 43 and a corrugated strip 44 adhesively secured thereto, with the composite strip 43-44 being wound upon itself into the form of a block 45 of approximately square cross section, this block preferably being closed at its ends by sheets of cardboard 46. Blocks constructed similarly to the block 45 may be substituted for the spacer or supporting blocks of the pallets of Figures 1 to 7, inclusive. Also, if desired, corrugated structures similar to block 45 may be substituted for the interior corrugated structures of the platform member and, when used, the base member, of the pallets of Figures 1 to 7, inclusive. Tests have shown that pallets constructed of cardboard in accordance with my invention, as above described, have a compressive strength in excess of 130 pounds per square inch, which renders them capable of sustaining considerable loads such as are ordinarily encountered in many industrial operations. In addition to possessing adequate mechanical strength, the pallets of my invention may readily be produced at comparatively low cost, are capable of withstanding rough usage and have long life, and when they become unfit for further use, may be discarded without any substantial loss.

As above indicated, and as will be understood by those familiar with this art, changes in construction and arrangement of parts of my invention may be resorted to without departing from the field and scope thereof, and I intend to include all such variations, as fall within the scope of the appended claims, in this application, in which the preferred forms only of my invention have been disclosed.

I claim:

1. In a material handling pallet, a platform member, and a plurality of supporting blocks at one face of said member arranged in spaced parallel rows, said blocks respectively comprising a plurality of superposed units each formed of corrugated cardboard elements adhesively secured together face to face with the corrugations thereof perpendicular to said platform member and reinforcing sheets of cardboard adhesively secured to and closing the ends of said units, the latter being adhesively secured together and to said platform member.

2. In a material handling pallet, a platform member, and a plurality of supporting blocks at one face of said member arranged in spaced parallel rows, said blocks respectively comprising a plurality of superposed units each formed of corrugated cardboard strips adhesively secured together face to face with the corrugations thereof perpendicular to said platform member and reinforcing sheets of cardboard adhesively secured to and closing the ends of said units, the latter being arranged with the strips of each thereof substantially at right angles to the strips of the next adjacent unit, said units being adhesively secured together and to said platform member.

3. In a material handling pallet, a platform member, a base member, and spacer blocks between said members adhesively secured thereto

6

in spaced parallel rows respectively formed from a strip of corrugated cardboard wound into block form with its convolutions adhesively secured together and the corrugations thereof perpendicular to said platform and base members.

4. In a materials handling pallet intended for use with lift trucks, a load receiving platform, and a plurality of load supporting members at the underface of said platform effective for supporting the latter and the load thereon, said members respectively comprising a plurality of juxtaposed substantially concentric corrugated elements restrained against relative radial movement and disposed with the corrugations thereof substantially perpendicular to said platform.

5. In a materials handling pallet intended for use with lift trucks, a load receiving platform, and a plurality of load supporting members at the underface of said platform effective for supporting the latter and the load thereon, said members respectively comprising a plurality of juxtaposed substantially concentric corrugated elements formed of paper stock such as cardboard adhesively secured together so as to be restrained against relative radial movement and disposed with the corrugations thereof substantially perpendicular to said platform.

6. In a materials handling pallet intended for use with lift trucks, a load receiving platform, and a plurality of load supporting members at the under face of said platform respectively comprising a strip of corrugated cardboard paper stock wound spirally into block form with the convolutions thereof adhesively secured one to the other and thereby restrained against relative radial movement, said supporting members being adhesively secured at their upper ends to said platform.

7. In a materials handling pallet intended for use with lift trucks, a load receiving platform, and a plurality of load supporting members at the under face of said platform respectively comprising a strip of corrugated cardboard paper stock wound spirally into substantially cylindrical block form, said members being adhesively secured at their upper ends to said platform with the convolutions of the respective supporting members adhesively secured together.

8. In a materials handling pallet intended for use with lift trucks, a platform member and a base member substantially rectangular in plan, and a plurality of supporting members between said platform and base members attached thereto spaced apart transversely and lengthwise thereof providing passages therebetween for insertion of the fork of a lift truck into said pallet from any one of the four sides thereof, said supporting members being respectively formed of corrugated paper stock such as cardboard spirally wound into block form with the corrugations thereof disposed substantially perpendicular to said platform and base members.

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The following references are of record in the file of this patent:

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