March 1, 1966 W. U. MILLIKEN 3,237,786

PALLETIZED STRUCTURE OF CYLINDRICAL PRODUCTS

Filed April 8, 1964 2 Sheets-Sheet 1

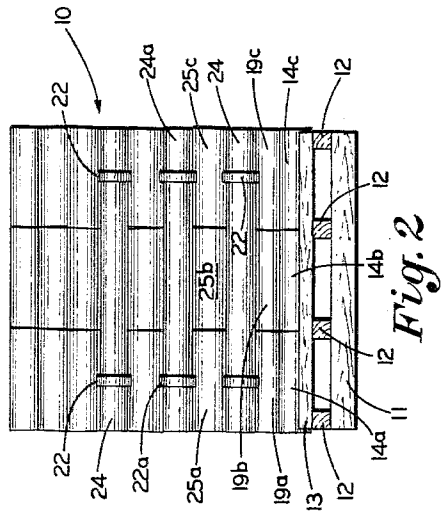


Fig. 2

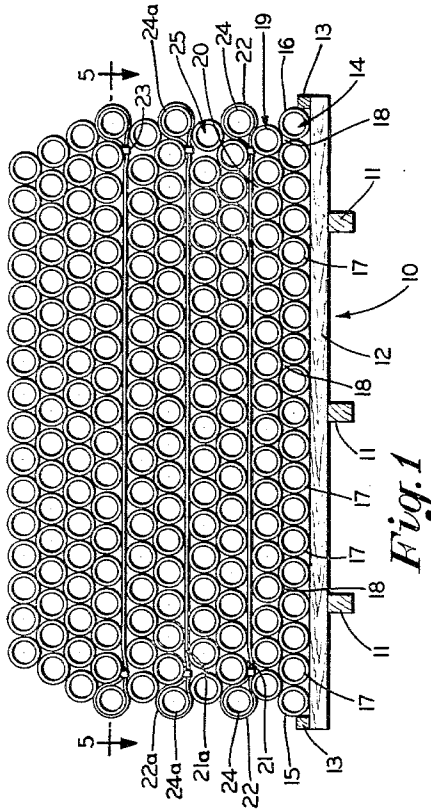


Fig. 1

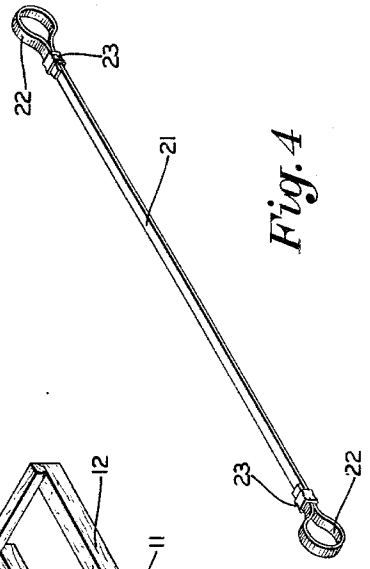


Fig. 4

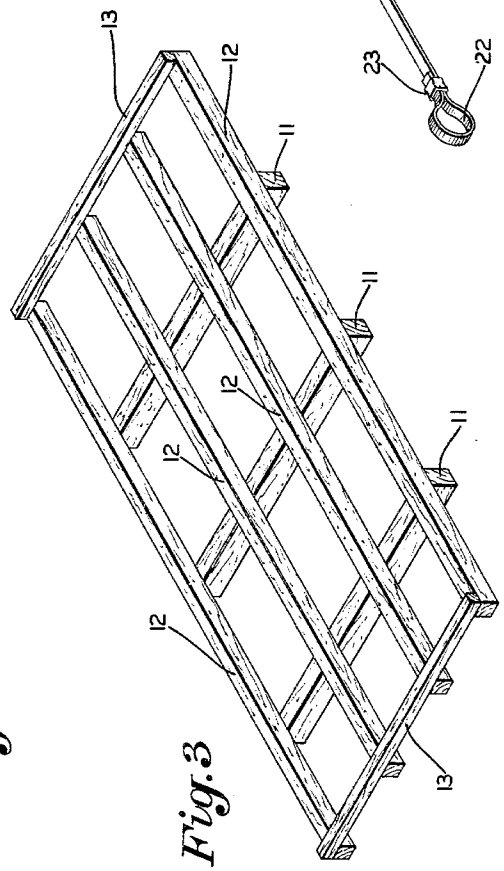


Fig. 3

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PALLETIZED STRUCTURE OF CYLINDRICAL PRODUCTS

Filed April 8, 1964 2 Sheets-Sheet 2

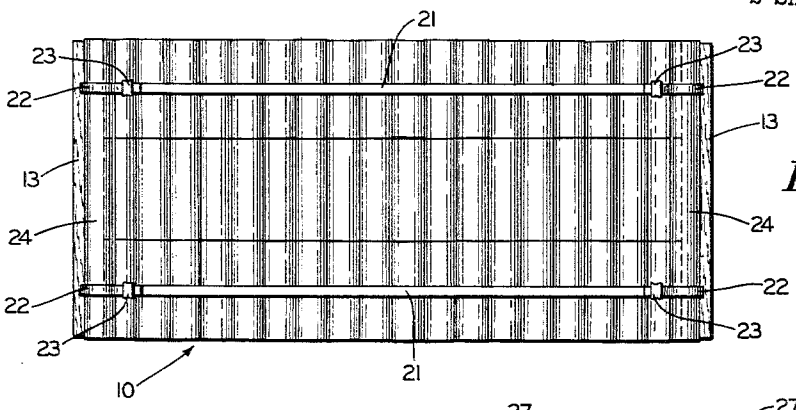


Fig. 5

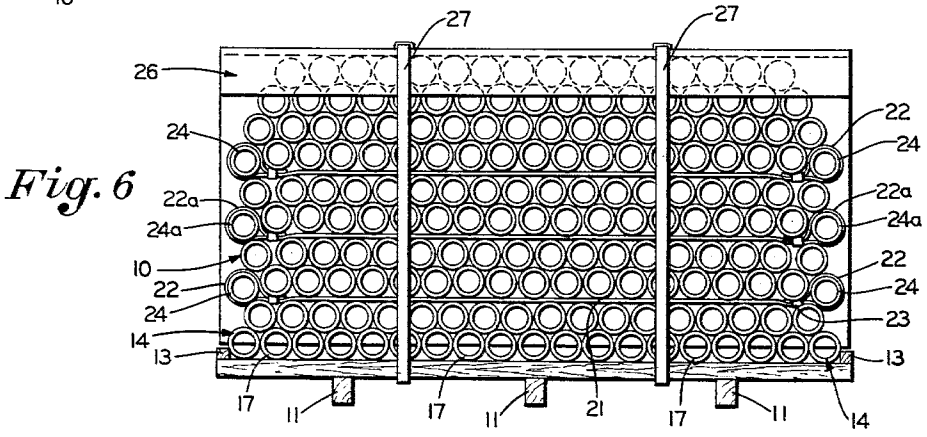


Fig. 6

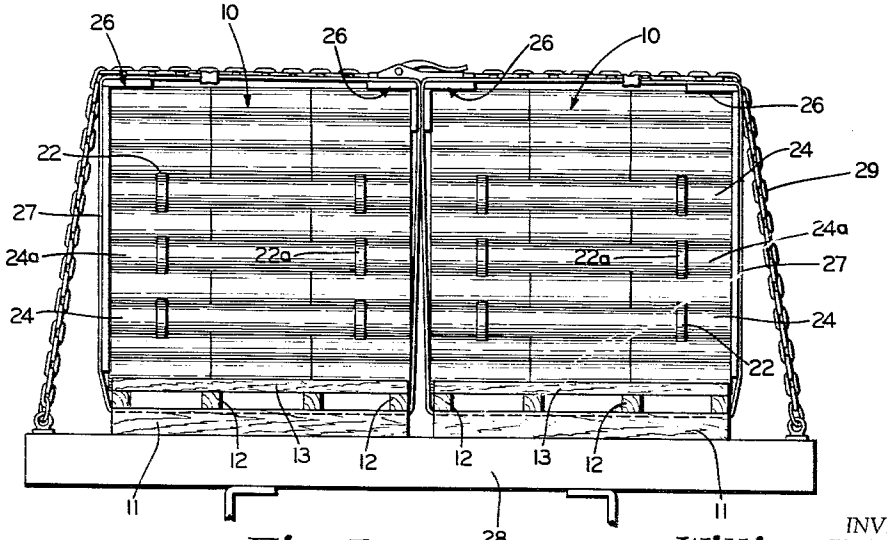


Fig. 7

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PALLETIZED STRUCTURE OF CYLINDRICAL PRODUCTS

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6 Claims. (Cl. 214—10.5)

This invention relates to palletized cylindrical products or the like, and more specifically this invention relates to a unitary loaded pallet of cylindrical products such as drain tile and the method of stacking the same which structure is adapted to be either stored at the product manufacture origin or shipped by vehicle.

The drain tile manufacturing industry, like other industries, requires facilities for storing and shipping their products in as economical a manner as possible. Frequently, large quantities of finished tile products must be stored at the tile factory prior to their shipment by truck, train or other vehicular transportation means. For convenience and economy, it would be desirable to ship the finished product in the same unit as it is stored. One or more handling operations of the individual tile products may be eliminated since the tile need not be loaded from storage piles onto a truck or other transporting vehicle. However, such is generally not done in the industry today.

The common method of stacking drain tile or the like for shipment consists generally of providing a heavy wooden pallet having a pair of heavy wooden upright sides and stacking one or more rows of the tile on the pallet between the two sides fitting as many of the individual tiles as possible into the confined space. Usually the tile is piled one upon another at random until the height of the pile is just below the top of the sides. Because of the force exerted on the sides by the weight of the tile which would tend to spread them apart, the sides are tied to one another at the top by any convenient means such as rope or wire.

This method of stacking presents several difficulties or objections. First, as previously mentioned, these pallets with their upright sides are constructed of heavy material, usually lumber, to provide the necessary strength for containing the tile on the pallet. Such pallets are, therefore, relatively expensive to build, thus making it desirable to use the pallets again as many times and as often as possible. So they may be used again, it is common practice to require a monetary deposit for the pallet to insure their return to the factory or to compensate for the loss if not returned.

These pallets, because of their heavy construction necessary for the strength required, weigh in the neighborhood of three hundred pounds and the freight costs therefor from the tile factory to the shipping destination and back is an economic consideration in addition to the capital investment involved in having and maintaining a supply of pallets.

Because of their high cost, these pallets are not used for storage purposes and the tile is normally stored at the factory yard by any convenient means such as pyramiding stacks thereof at level spots throughout the yard. One or more handling operations is, therefore, necessarily involved in the event it is not possible to load the finished tile directly from the production line onto the shipping pallets. Thus, a further cost factor is added to an already expensive procedure, and none of the above-mentioned costs are occasioned by either manufacturing or material costs for the tile products themselves.

I have discovered a tile stacking procedure and unitary palletized structure which obviates the aforementioned difficulties that have existed in the art for a great many

years and which eliminates the expensive procedures heretofore used.

Accordingly, it is a general object of the present invention to provide a pallet for stacking cylindrical products which may be constructed of lightweight inexpensive material.

It is a further object of the present invention to provide a pallet structure for cylindrical products wherein the products may be economically stored and subsequently shipped by vehicle in the same unitary package.

Also, it is an object of the present invention to provide a pallet structure for cylindrical products in which the pallet and stacking means need not be returned to the shipping origin and which may be disposed of after shipping.

Moreover, it is an object of the present invention to provide a pallet structure for cylindrical products which does not significantly affect the shipping costs for the products shipped and which does not require shipping costs for return to the factory.

Further, it is an object of the present invention to provide a pallet structure for cylindrical products which is inexpensive enough to construct that it does not require a deposit to insure its return to the tile factory.

Finally, it is an object of the present invention to provide a palletized structure for cylindrical products which overcomes the objections which have existed in the art, which achieves the stated objects in a simple, inexpensive and effective manner heretofore unobtainable, and which satisfies the needs which have existed in the art for a great many years.

These and other objects and advantages apparent to those skilled in the art from the following description and claims may be obtained, the stated results achieved and the described difficulties overcome by the methods, steps, procedures, combinations, arrangements and structures which comprise the present invention, the nature of which is set forth in the following general statement, preferred embodiments of which—illustrative of the best mode in which applicant has contemplated applying the principles—are set forth in the following description and shown in the drawings, and which are particularly and distinctly pointed out and set forth in the following claims forming part hereof.

The nature of the improved palletized structure for cylindrical products may be stated in general terms as including a pallet base member consisting of a plurality of longitudinal support members mounted on a plurality of transverse foot members, the support members spaced apart approximately a distance equal to the length of the products to be palletized thereon, a stop cleat mounted transversely at each end of the longitudinal support members, a base row of transversely disposed cylindrical products extending between the cleats and resting on the support members, each of the individual products being located closely adjacent or abutting one another and the first and last product in the row each abutting one of the stop cleats, the adjacent products in a row forming a series of transverse grooves, a second row of products supported by the first row of products and resting in the grooves formed by the first row of products, the second row of products forming a second series of transverse grooves, a third row of products supported by the second row of products in the grooves formed by the second row products, a pair of steel strapping members interposed between the second and third rows, each strap member having a loop formed at each end, both of the loops at one end of the two strap members encircling a first end-retaining product and both of the loops at the other end of the two two strap members encircling second end-retaining product, the end-retaining product at each end abutting the outside product in the second row and the

outside product in the third row, the third row of products and the two end-retaining products forming a third series of grooves and a fourth row of products resting in the grooves.

By way of example, embodiments of the improved pallet structure for cylindrical products are shown in the accompanying drawings forming a part hereof in which:

FIGURE 1 is a side elevation of a unitary palletized structure of the present invention;

FIG. 2 is an end view of the structure shown in FIG. 1;

FIG. 3 is a isometric view of the base member and stop cleats which form a part of the structure of the present invention;

FIG. 4 is a perspective view of one of the strap members having loops at each end which form a part of the present invention;

FIG. 5 is a view taken along the lines 5—5, FIG. 1;

FIG. 6 is a view of the palletized structure ready for loading onto a vehicular means of transportation; and

FIG. 7 shows several of the pallets shown in FIG. 6 as loaded on a vehicle.

Similar numerals refer to similar parts throughout the various figures of the drawings.

Referring specifically to FIGS. 1, 2 and 3 in the drawings, the unitary palletized structure for cylindrical products is generally indicated by reference numeral **10**. The pallet itself, which is a part of the present invention, is constructed of a plurality of foot members **11** with two or more longitudinal support members **12** mounted thereon at spaced intervals across the foot member **11**. The distance between adjacent support members **12** is determined by the length of the cylindrical products which are to be subsequently palletized. A pair of stop cleats **13** are mounted on the support members **12**, the pallet having a cleat at each end which extends completely across the pallet.

In accordance with the present invention, a base layer **14** of cylindrical products consisting of one or more rows indicated by **14*a***, **14*b*** and **14*c*** is laid on the pallet support members **12** extending between the stop cleats **13**. The first product **15** and last product **16** in each row abut stop cleats **13**, thus preventing these products and the others in the row from rolling off of the pallet support members **12**.

The remaining products in the row, indicated by reference numeral **17**, are either very closely adjacent to each other or actually abut each other when a complete row is laid on the pallet. In other words, the distance between the stop cleats **13** is approximately equal to the length that a row of products will occupy on the pallet.

Adjacent products in the rows **14*a***, **14*b*** and **14*c*** which are either abutting or located very close to one another form a series of transverse grooves **18** throughout the length of the row, the number of grooves being one less than the number of products which constitute the first row.

A second layer of cylindrical products **19** is, in accordance with the present invention, placed upon the base layer **14** and this layer of products consists of individual rows of products **19*a***, **19*b*** and **19*c***. The individual products which comprise the second layer **19** are each placed in the grooves **18** so that they securely rest upon the pallet structure in pyramid fashion. This second layer of products **19** forms a second series of grooves **20** which is adapted to receive another row of cylindrical products.

In accordance with the present invention, two lengths of strap material **21**, formed of a suitable strong material such as steel, is laid upon the second layer of cylindrical products **19**. Referring to FIG. 4 which illustrates one of the straps **21** used in accordance with the present invention, a loop **22** is formed at each end of the strap **21** by any convenient means such as shown in FIG. 4 by doubling back a short length of the strap and clamping the doubled-back portion with a conventional steel strapping clamp **23**.

The loop portion **22** of the straps are then placed over an end-retaining cylindrical product **24**. Each end-retaining product **24** is in accordance with the present invention as long as the width of the palletized structure formed by the three side-by-side rows **14*a***, **14*b*** and **14*c***, or **19*a***, **19*b*** and **19*c***.

For stability purposes, each of the end-retaining products **24** may have two or more of the straps **21**; however, for the purpose of illustration two are shown. It is to be understood that the end-retaining product could conceivably be split in two and four straps used in accordance with the principles of the present invention. However, it has been found most convenient to use end-retaining products which are as long as the pile of products will be wide.

A third layer of products may then be placed upon the first and second layers consisting of more rows of products which extend between the end-retaining product **24**. The end-retaining products which are held by the strap member **21** prevent the individual products from either rolling or otherwise falling off of the pile.

This third series of rows of products which constitute the third layer, together with the two end-retaining members **24**, form a third series of grooves which may then receive a fourth layer of products **24**. The fourth layer **25** may be comprised of layers of products **25*a***, **25*b*** and **25*c***.

A second pair of strap members **21*a*** may then be placed upon the fourth layer, each of the two straps having loops **22*a*** at each end. The loops at each end are placed around a second pair of end-retaining products **24*a*** and a fifth layer of products may then be placed on the fourth layer and confined on the pile by the two end-retaining products **24*a***.

Subsequent layers of products may be placed upon one another by alternating a layer of individual products with another layer of individaul products which has a pair of end-retaining members held by strap members at each end. When the desired pile height is reached, the layers may then be pyramided by merely placing the individuel layers of tile in the grooves formed by the preceding layer of tile.

FIG. 6 is a side elevation of a palletized unit as the structure is prepared for shipment. The pallet of products **10** which is formed of the first and second base layers of products **14** and **17** and the alternating layers of products having end-retaining products and layers placed on the end-retaining product layer is built to the desired height.

Protective pads of suitable material **26** are placed at the top corners of the pallet structure. The pads **26** may extend completely down the side of the pile of products to protect the same during transportation, if desired.

One or more strap members **27** may then be placed around the structure to completely secure the whole structure, thus making the palletized unit a rigid and stable unit. The palletized unit as shown in FIG. 6 may then be placed upon the bed of a truck or any other suitable means of transportation as shown in FIG. 7. In FIG. 7 several of the palletized structures are securely held on the bed **28** of a truck by clamping chain **29** which is standard equipment on many flat-bed trucks.

In accordance with the principles of the present invention, the palleted structure shown in FIGS. 1, 2 and 5 may be constructed as the individual cylindrical products are manufactured. The palletized structure as thus illustrated is stable enough to be moved from place to place at the tile factory by a conventional fork lift truck.

For purposes of illustration, the individual products shown in the drawings are relatively short in comparison to the ultimate width of the palletized structure. However, wider products can be used, each layer of products then consisting of a smaller number of rows.

Furthermore, the end-retaining products which are confined by the strap members are shown as long as the palletized tile is wide. However, it would be possible to construct a palletized structure in accordance with the

principles of the present invention by using a shorter length of end-retaining products and confining each of these end-retaining products with one or more strap members.

Furthermore, it might be desirable to use more than the two strap members as shown in the drawings, in the event the weight of the tile pile is enough to materially affect the strength of the strapping. Additional straps would then be used to provide the necessary strength to securely retain the end-retaining products.

It is relatively easy to determine the length of the strap members and the size of the loops which will be used to accommodate different sizes and shapes of generally cylindrical products. These straps may be made in quantity in advance of the product pile construction and then be used as required when forming the palletized structure.

Furthermore, it can be seen that the palletized structure can conveniently be used to form piles of products which have shapes slightly different than those illustrated and the scope of the invention is not intended to be limited only to true cylindrical products. For example, products which might have a fluted outer surface or which may have hexagonal or other geometrical shape could be palletized using the principles of the present invention.

As indicated above, the palletized unit as shown in FIGS. 1, 2 and 5 may be formed as the individual products are manufactured and come off a production line. The palletized structures may then be prepared for shipment or stored in the yard of the factory. It is, therefore, possible to eliminate one handling operation since there is no need to transfer the individual products from storage to shipping pallets.

Important features of the present invention include the provision of the pallet having stop cleats at each end together with the provision of and utilization of end-retaining cylindrical product members confined by a suitable strap member. hus, it is possible to form a palletized structure with a minimum of lumber, yet which is stable enough to be stored and shipped in the same unit and which may be handled easily by convenient transportation means such as fork lift trucks and the like. Further by eliminating the expensive pallet heretofore used, it is possible to eliminate the deposit fee normally charged and substantially reduce the cost of transportation of the products.

Thus, the unitary palletized structure of the present invention overcomes the stated difficulties and problems and objections which have existed in the art for a long period of time; eliminates the high cost of storing and shipping cylindrical products which has heretofore existed; achieves the stated objects and accomplishes the results described and solves the problems that have existed in an inexpensive, efficient and simple manner.

In the foregoing description, certain terms have been used for brevity, clearness and understanding; but no limitations are to be implied therefrom beyond the requirements of the prior art because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the description and illustration of the invention is by way of example, and the scope of the invention is not limited to the palletizing of the exact products shown because the sizes, shapes, configurations, etc. of the products may be varied without departing from the fundamental principles of the present invention.

Having now described the features, discoveries and principles of the invention, the construction of a palletized unit, the procedure to be carried out and the advantageous, new and useful results obtained, the new and useful discoveries, principles, methods and steps, combinations, subcombinations, arrangements and mechanical equivalents thereof obvious to those skilled in the art are set forth in the appended claims.

I claim:

1. A palletized unit for packaging elongated cylindrical products including a pallet base member having a plurality of transverse foot members, a plurality of longitudinal support members mounted on the foot members and a pair of stop cleats mounted on the support members, a base layer of elongated cylindrical products, consisting of at least one row of products, laid on the support members and extending between the cleats with the longitudinal axis of the products being perpendicular to the support members, each individual cylindrical product in the layer abutting the next adjacent product and each end product abutting one of the stop cleats, the tops of the adjacent cylindrical products forming a series of lateral grooves, a second layer of products resting on the first layer in the grooves, the second layer of individual products forming a second series of lateral grooves, a third layer of products resting on the second layer in the second layer grooves, a pair of elongated strap means extending longitudinally of the layers interposed between the second layer of products and the third layer of products having a preformed loop at each end providing engaging means at each end, each engaging means of one strap engaging one of a pair of end-retaining products, the third layer and the pair of end-retaining products forming a third series of lateral grooves and a fourth layer of products resting on the third layer in the third layer grooves.

2. Palletized unit of elongated cylindrical products as defined in claim **1**, in which subsequent layers of products are pyramided upon the fourth layer.

3. Palletized unit of elongated cylindrical products as defined in claim **1**, in which subsequent layers of products each having a pair of end-retaining products engaged by a plurality of pairs of strap means are alternated with interemdiate layers of products, the alternating layers resting on the fourth layer in the fourth layer grooves.

4. Palletized unit of elongated cylindrical products as defined in claim **1**, in which protective means are secured to the outer surfaces of the palletized unit.

5. Palletized unit of elongated cylindrical products as defined in claim **3** in which protective means are secured to the outer surfaces of the palletized unit.

6. Palletized unit of elongated cylindrical products as defined in claim **3** in which at least one layer of products is pyramided upon the last layer of intermediate products.

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