Oct. 9, 1951 R. G. BOWMAN ET AL 2,570,757

HANDLING BAGGED MATERIALS

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Fig. 1

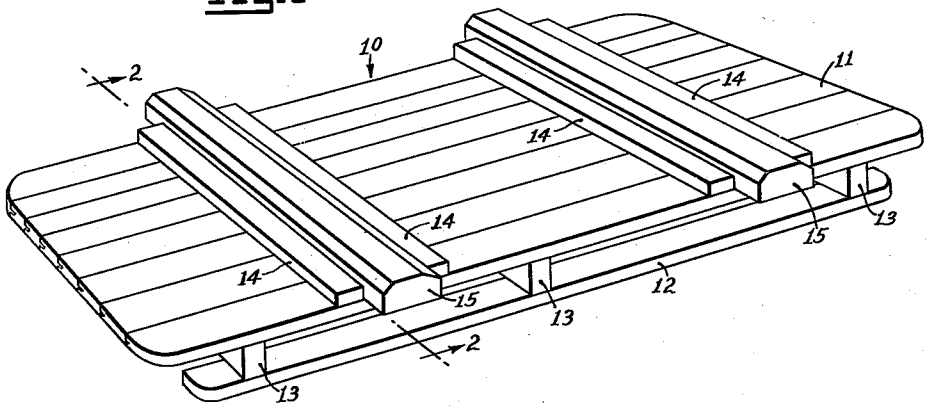


Fig. 2

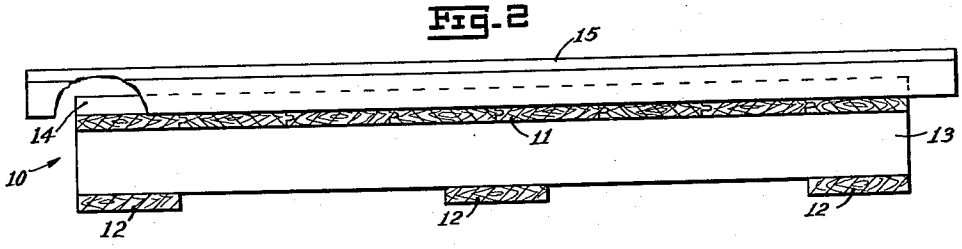
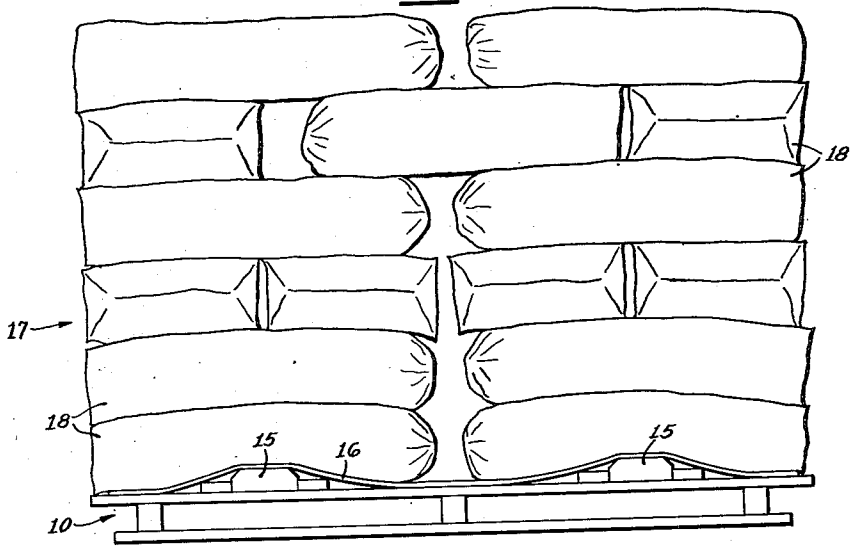


Fig. 3



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Fig. 4

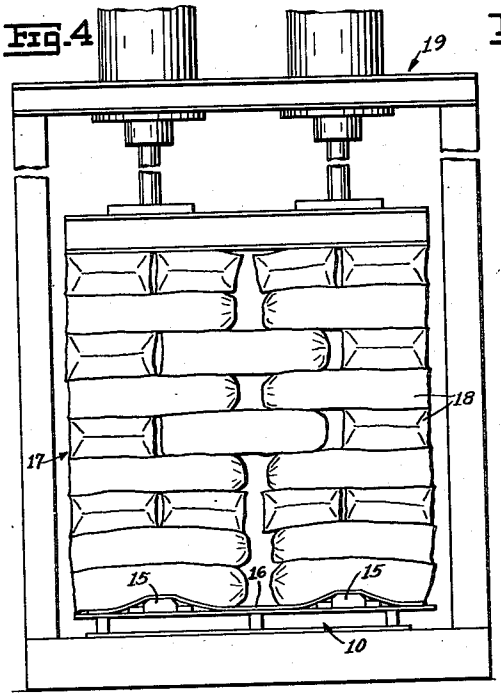


Fig. 5

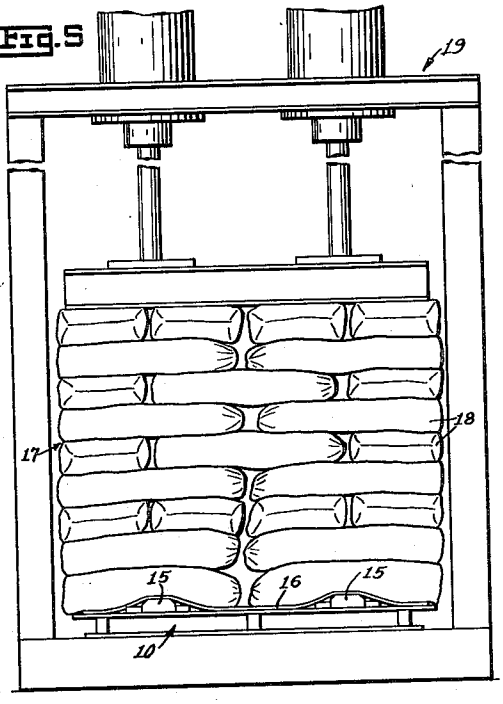
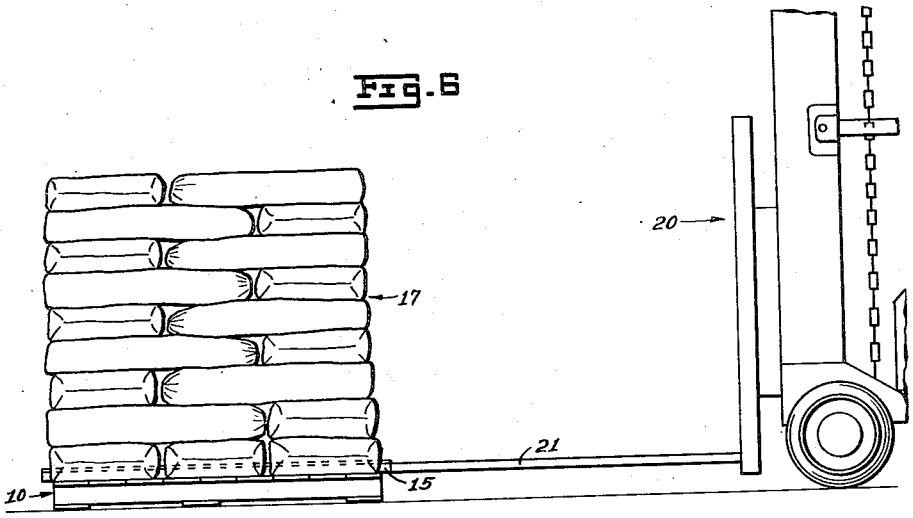


Fig. 6



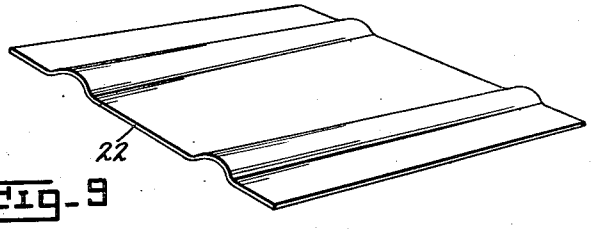


Fig. 9

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Fig. 7

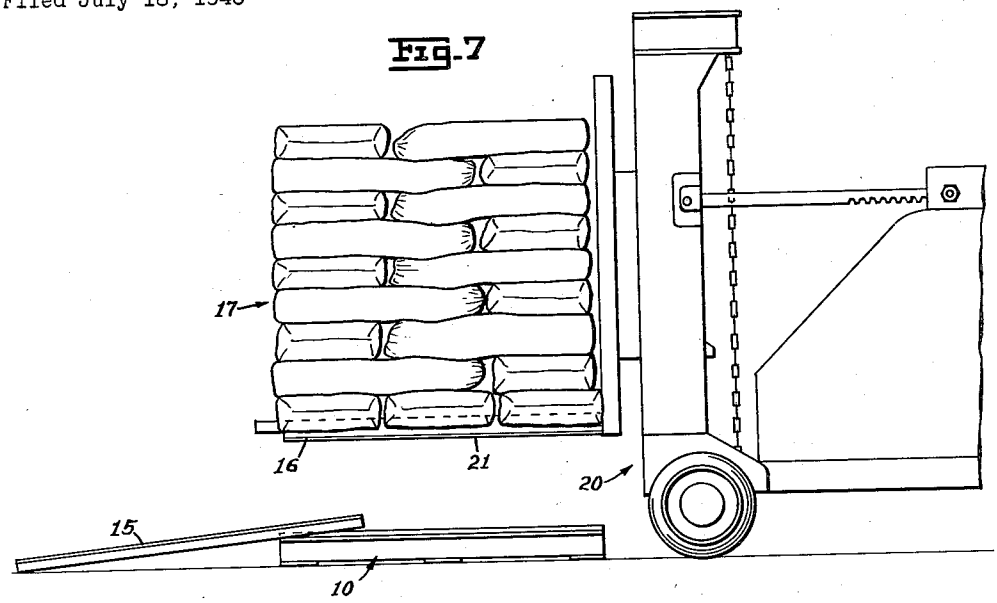
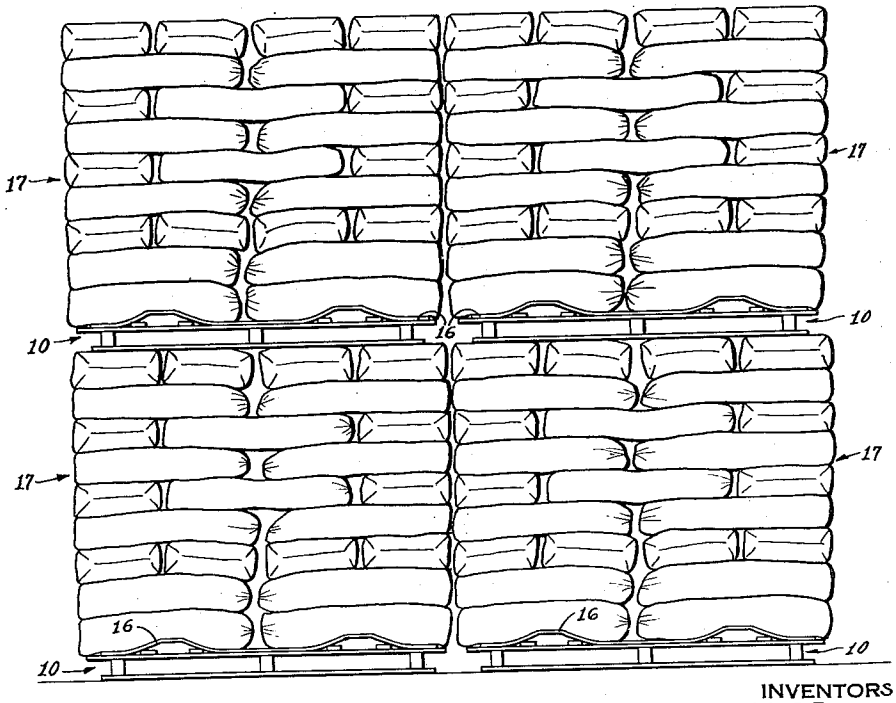


Fig. 8



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UNITED STATES PATENT OFFICE

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HANDLING BAGGED MATERIALS

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Application July 18, 1946, Serial No. 684,564

7 Claims. (Cl. 214—152)

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This invention relates to handling bagged materials, and particularly to handling stacks of a considerable number of bags of material on pallets. The invention provides an improved method for thus handling bagged materials, involving the use of a very inexpensive pallet that can economically be discarded after a single use.

It is quite common practice to handle bagged materials in stacks piled on platform supports commonly known as pallets. The stack of bags on the pallet can be handled as a unit by cranes or lift trucks, with considerable economy as compared with individual handling of each bag. The pallet on which the bagged material is stacked usually is made of wood, sometimes reinforced with steel, and often provided with short legs so that the lifting arms of lift trucks may reach under the pallet and lift it with the load of bags stacked upon it. Pallets thus made are sturdy but costly.

To avoid handling the bags individually when they are loaded in a freight car or truck for shipment to a customer, the pallet together with its load of bags sometimes is deposited in the car or truck and is shipped with the bagged material to the customer. Because the pallet is expensive, it must be returned to the shipper. Moreover, its weight is appreciable, and it constitutes part of the load on which freight charges must be paid. Because of the difficulty and expense involved in shipping the pallet along with a load of bags, and in having the pallet returned to the shipper, it is often the practice to unload the bags by hand from the pallet and to stack them by hand in the freight car or truck. This involves much hard manual labor and is correspondingly expensive.

The present invention provides an improved method of handling bagged materials, involving the use of a particularly inexpensive pallet. The invention retains the advantages and economies involved in handling and shipping unit stacks of bags of materials on pallets, but since the pallet used in accordance with the invention may be discarded after a single use, the expense and difficulties involved in having the pallet returned are avoided.

In handling bagged materials in accordance with the invention, a pair of spacers is mounted on a substantially rigid platform, and a pallet of deformable material is laid over the spacers. The pallet advantageously is merely a sheet of heavy paper-board or similar material. A considerable number of bags of material then are stacked on the pallet board, and the resulting

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stack is compressed (either in a press or by its own weight) sufficiently to deform the pallet about the spacers and to cause the stacked bags to interlock somewhat and form a stable stack. After thus compressing the stack, the spacers are removed from beneath the pallet board, thereby opening essentially parallel grooves formed as a result of the deformation of the pallet about the spacers. The stack of bags on the pallet then may be handled as a unit by lifting with arms inserted into the grooves under the pallet. The compressed stack of bags on the pallet holds together well enough so that with the support provided by the paper-board or other deformable pallet, it may easily be handled as a unit in transporting it (by means of a lift truck, for example) to a warehouse, and from a warehouse to a freight car or truck for shipment. The grooves formed under the pallet remain sufficiently well defined so that lifting arms may be inserted under the pallet and its load a considerable number of times, and over a considerable period of time.

The pallet employed may be initially in the form of a flat sheet of paper-board or the like, and the grooves underlying it may be formed initially and finally by the compressing operation. Alternatively, the pallet may be preformed to its final shape, and in such case the spacers are provided simply to prevent flattening of the preformed pallet in the regions where the pallet has been shaped to define grooves to receive lifting arms.

Since the paper pallet contemplated by the invention is very inexpensive, it may be discarded after a single use.

The invention is described in greater detail below with particular reference to the embodiment illustrated in the accompanying drawings, in which

Fig. 1 is a perspective of a platform such as may be used with advantage in preparing a stack of bags on the deformable pallet;

Fig. 2 is a section taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is an end view of a stack of bags on a deformable pallet positioned on the platform shown in Fig. 1;

Fig. 4 is a view of a stack of bags in a press preliminary to compressing the stack;

Fig. 5 is a view of the stack in the press after being compressed;

Fig. 6 is an elevation of the stack after removal from the press and preparatory to lifting it from the platform;

Fig. 7 is an elevation of the stack being carried by a fork-lift truck;

Fig. 8 is an end view of four unit stacks as they may be arranged for storage in a warehouse; and

Fig. 9 is a perspective of a preformed pallet.

The platform 10, shown particularly in Figs. 1 and 2, is an advantageous adjunct to handling bags in accordance with the present invention, but its use is not essential. It comprises a wooden stage 11 supported on but spaced from wooden strips 12 by cross ties 13. The upper surface of the stage 11 is provided with guide cleats 14 defining grooves within which paraffined, soaped, greased, or otherwise lubricated wooden spacers 15 are slideably received.

The platform 10 provides a base on which to build the stack of bags subsequently to be handled as a unit in accordance with the invention. The platform with its load of bags may be carried by a fork-lift truck whose arms extend into the space between the platform stage 11 and the supporting strips 12.

In accordance with the invention, a deformable pallet board 16 is placed on the platform 10 over the spacers 15, and a stack 17 of filled bags 18 is built up on the pallet, as shown in Fig. 3. The pallet board 16 may advantageously consist of a sheet of cardboard or other heavy paper product, corrugated or not, of about the same dimensions as the base of the stack of bags piled thereon. For the most part the pallet rests on the upper surface of the platform stage, but it is spaced therefrom along parallel lines by the spacers 15. The lines along which the spacers are arranged correspond to the spacing of the lifting arms of the fork-lift truck used in subsequently handling the stack of bags.

The bags themselves may be multiwall or other paper bags, or fabric bags, containing say 50 pounds each of pulverulent or granular material. Advantageously all of the bags in the lowermost tier run transversely with respect to the spacers 15, but subsequent tiers are stacked with at least some of the bags laid at right angles to the bags on the tier above and below. This method of stacking the upper tiers provides for better interlocking of the stack and increases its stability for handling purposes.

After a stack of suitable size has been built up on the pallet 16 and platform 10, the platform and its load are deposited in a hydraulic or other type press 19 (Figs. 4 and 5). For convenience in handling at this stage of the operations, the stack of bags is carried on the platform 10. As stated above, however, it is not necessary that the platform 10 be employed. If desired, for example, the stack of bags on the pallet 16, overlying the spacers 15, could equally well have been built up within the press 19, without the use of any platform other than that which constitutes the base of the press.

In the press, the stack of bags is compressed with sufficient force so that bags are squeeezed together, compacting the stack and increasing its stability and causing the bags to interlock somewhat, the empty spaces between the bags being largely filled as a result of compression and bulging of the bags. At the same time, the pallet 16 is deformed by being pressed quite closely about the spacers 15. Thus the pallet itself and the bags in the lowermost tier are deformed sufficiently to define parallel grooves beneath the stack along lines corresponding to the positions of the spacers. Fig. 4 shows the load of bags as deposited in the press 19 preparatory to compressing the stack, and Fig. 5 shows the stack after it has been compressed. A comparison of the two figures indicates the extent to which the stack is compressed. A compressive pressure of the order of a few hundred pounds per square foot of upper surface area of the stack generally is satisfactory, although in particular cases a greater pressure may be necessary, or a lesser pressure may be sufficient.

Compression of the stacked bags in a special press is not always necessary. Often the weight of the bags is sufficient so that by the time the full stack has been built, the combined weight of the stacked bags suffices to deform the pallet and the lowermost bags properly about the spacers. Moreover, if the stack in such case is not to be handled excessively, it is not necessary to compress it in a press merely to increase its stability. In appropriate cases, therefore, the invention contemplates not using the press. Appropriate cases of this character are those in which the bagged material is fairly heavy and where stacked bags of such material pack down under their own weight.

After compressing the stack of bags, the platform and its load are removed from the press (if a press has been employed), and the stack thereafter may be handled as a unit on the pallet without further use of the platform 10. To lift the stack of bags from the platform (Fig. 6), a fork-lift truck 20 is brought into position with its lifting arms 21 abutting the ends of the spacers 15. The truck is then driven forward, and its lifting arms push the spacers 15 out from under the stack of bags. The paraffin, grease or soap with which the spacers 15 have been lubricated greatly facilitates the ease with which they are slid out from under the pallet and the superimposed stack of bags 17. Concurrently the lifting arms 21 are brought into lifting position beneath the stack, in the grooves formed by deformation of the pallet about the spacers, and the stack may now be lifted by elevating the lifting arms 21 of the truck.

Fig. 7 shows the appearance of the stack 17 as it is carried on the lifting arms 21 of the truck 20 after it has been lifted from the platform 10, and after the spacers 15 have been pushed out from under the stack. The pallet 16 of paper-board or similar material provides an adequate base on which to carry the compressed stack, particularly when the bags in the lower tier of the stack have been arranged with their longest dimension at right angles to the direction of the grooves formed beneath the stack and hence at right angles to the lifting arms of the truck. The stack of bags may be carried by the truck to a warehouse for storage, or to a freight car for shipment to a customer. The pallet, being of very inexpensive material, need not be salvaged. Further, since it is very light in weight, it adds no material cost to the transportation charges when shipped with the stack of bags. Oftentimes when bagged materials are shipped in freight cars it is necessary to line the sides and bottom of the car with paper. Stacks prepared and handled on paper-board pallets in accordance with the invention require no lining on the floor of the car, as the pallet itself serves as the lining.

If it is necessary to store the bags and rehandle them later, the stacks may be piled in a warehouse, for example in the manner shown in Fig. 8. Several stacks 17 may be piled side by

side, or one on top of another, along aisles so that the individual stacks each may be reached for handling as a unit by a fork-lift truck. If several stacks are piled one on top of the other, it may be advantageous to support some or all of the stacks on platforms 10, although this is not necessary.

The grooves formed beneath each stack by deformation of the pallet 16 remain sufficiently well defined in storage, and even sometimes after being shaken up by transportation in a freight car, so that a fork-lift truck may reach under the stack to lift it for handling as a unit. The deformed paper-board pallet is adequately durable to provide a satisfactory foundation on which to handle the stack of bags for so long as the grooves remain sufficiently well defined to permit inserting the arms of a fork-lift truck.

Particular mention has been made in the foregoing description of handling stacked bags by a fork-lift truck. Such equipment is particularly convenient for handling stacked bags, but they may be handled otherwise, if desired. For example, the stack of bags may be handled by a crane hooked on to bars inserted through the grooves underlying the stack, or they may be handled in any other convenient manner by any device which permits inserting lifting arms or bars in the grooves beneath the stack.

While, as stated above, the use of wooden platforms is not necessary in preparing or handling the stacks of bags in accordance with the invention, they are helpful and increase the flexibility of the handling operations. They need not leave the plant in which the stack of bags is prepared, however, and fewer are required even within the plant than when the bags are always handled on them, as when the platforms themselves serve as the pallets.

The paper-board pallet may, if desired, be preformed by folding or molding to its final shape. Such a preformed pallet 22 is illustrated in Fig. 9. In such event the spacers 15 serve merely to prevent flattening of the pallet in a region in which the grooves underlying the pallet are defined. A heavy-bodied adhesive or other stiffening agent may be applied to the pallet in the region where it is deformed to provide the grooves. Such a stiffening agent will have the effect of preventing the pallet from becoming flattened in the region of the grooves for an increased length of time, thereby permitting an increased amount of handling of the stack of bags on the pallet. The stiffening agent may be applied just before the stack of bags is built up on the pallet, or it may be applied considerably in advance when the pallet boards are first prepared for use. For example, in the case of preformed pallets, it may be applied at the time when they are preformed and cut to size. If the pallet is composed of a material not normally considered moisture proof, such as paper-board or cardboard, it may be coated or impregnated with a bitumen, resinous composition, or other suitable moisture-proofing agent, to protect the bags from injury by moisture in case the stack should be deposited in a damp location.

Preforming, stiffening, and moisture-proofing the pallets as described above add but little to the cost, and while they improve the pallet and the service it is able to render, they do not make it too expensive to discard after a single use.

The pallet may, of course, be composed of some material other than paper-board or cardboard, such as plastic sheeting or papier-mâché and

if the material of which it is made inherently possesses adequate stiffness and resistance to moisture penetration, further treatment to impart these qualities is unnecessary.

The new handling method and the new pallet may be used with advantage in handling any material that can be shipped in bags. For example, it may be used in handling bagged zinc oxide, bagged phosphate fertilizer, bagged cement, bagged chemicals, bagged foodstuffs, and the like. The load of bags that may be carried on the new pallet may, in general, be about as large and heavy as have heretofore been considered economic to handle. Consequently, use of the invention does not entail any sacrifice in the size of the stack handled as a unit.

We claim:

1. The method of handling bagged material which comprises arranging a pair of spacers in substantially parallel relation on a substantially rigid platform, placing a deformable pallet board over the spacers, stacking a considerable number of bags of material on the deformable pallet, compressing the resulting stack sufficiently to deform the pallet about the spacers and to increase the stability of the stack somewhat, removing the spacers and thereby opening essentially parallel grooves formed by deformation of the pallet about the spacers, and thereafter handling the stacked bags as a unit by lifting with arms inserted into said grooves under the pallet.

2. The method of handling bagged material which comprises stacking a considerable number of bags of material on a deformable pallet positioned on a pair of substantially parallel spacers, compressing the resulting stack sufficiently to deform the pallet about the spacers and to increase the stability of the stack, somewhat, removing the spacers and thereby opening essentially parallel grooves formed by deformation of the pallet about the spacers, and thereafter handling the stacked bags as a unit by lifting with arms inserted into said grooves under the pallet.

3. The method of handling bagged material which comprises stacking a considerable number of bags of material on a pallet of deformable sheet material positioned over a pair of substanstantially parallel non-deformable spacers, compressing the resulting stack sufficiently to increase the stability of the stack somewhat, the spacers serving to prevent flattening of the pallet in the regions where they underlie it during the compression operation, removing the spacers and thereby opening grooves beneath the pallet, and thereafter handling the stacked bags as a unit by lifting with arms inserted into said grooves.

4. The method of handling bagged material which comprises stacking a considerable number of bags of material on a pallet of deformable sheet material positioned over a pair of substantially parallel non-deformable lubricated spacers, compressing the resulting stack sufficiently to increase the stability of the stack somewhat, the spacers serving to prevent flattening of the pallet in the regions where they underlie it during the compression operation, removing the spacers and thereby opening grooves beneath the pallet, and thereafter handling the stacked bags as a unit by lifting with arms inserted into said grooves.

5. The method of handling bagged material which comprises arranging a pair of spacers in substantially parallel relation on a substantially rigid platform, placing a deformable pallet board over the spacers, stacking a considerable number

of bags of material on the deformable pallet, the weight of a normal stack of bags alone being sufficient to deform the pallet about the spacers, removing the spacers and thereby opening essentially parallel grooves formed by deformation of the pallet about the spacers, and thereafter handling the stacked bags as a unit by lifting with arms inserted into said grooves under the pallet.

6. A pallet suitable for use in handling stacked bags of material which maintains substantially an arched structure when deformed together with the bags, consisting essentially of a sheet of paper, the major portion of said sheet lying substantially in a plane, whereby when said sheet is placed on a planar supporting surface said planar portion of the sheet will rest flat against it, and when bags are stacked on said planar portion of the sheet, substantially the entire weight of the stacked bags will be supported by said planar portion of the sheet and the underlying support, said sheet having a pair of spaced substantially parallel arched portions extending outwardly at one face from the bag-supporting planar portion of the sheet, said arched portions extending to one side edge of the sheet and providing grooves to receive the lifting arms of a lifting truck.

7. A readily handled assembly of bagged material comprising a pallet consisting essentially of a sheet of paper, and a considerable number of bags of material stacked thereon, the pallet and

the lower surface of the stack of bags being substantially identically configured, the major portion of said pallet lying substantially in a plane, whereby when said pallet and the bags of material stacked thereon are placed on a planar supporting surface said planar portion of the pallet will rest flat against it with substantially the entire weight of the stacked bags being supported by said planar portion of the pallet and the underlying support, said pallet and the lower surface of said stack of bags thereon having a pair of spaced substantially parallel arched portions extending away from the planar portion of the pallet and into the lower surface of the stack of bags, said arched portions extending to one side edge of the pallet and the lower surface of the stack of bags and providing grooves to receive the lifting arms of a fork-lift truck.

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