Sept. 28, 1965 A. EPSTEIN 3,208,606

STACKING APPARATUS

Filed Jan. 30, 1962

Fig. 1.

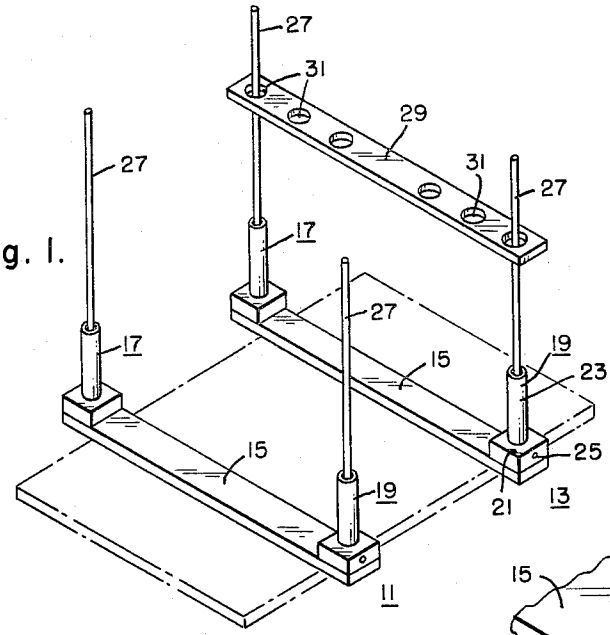
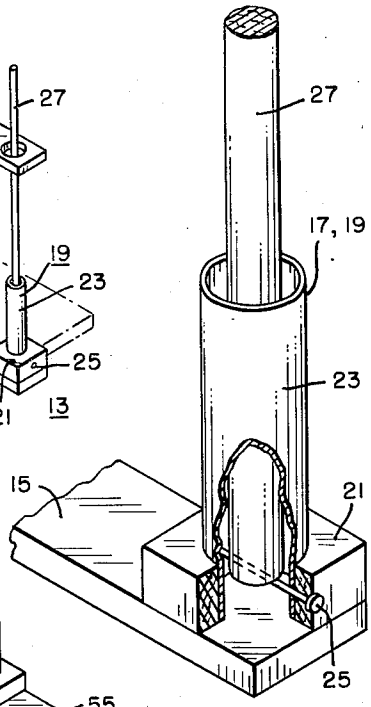


Fig. 2.



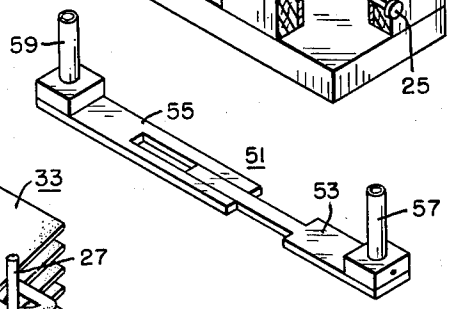


Fig. 4.

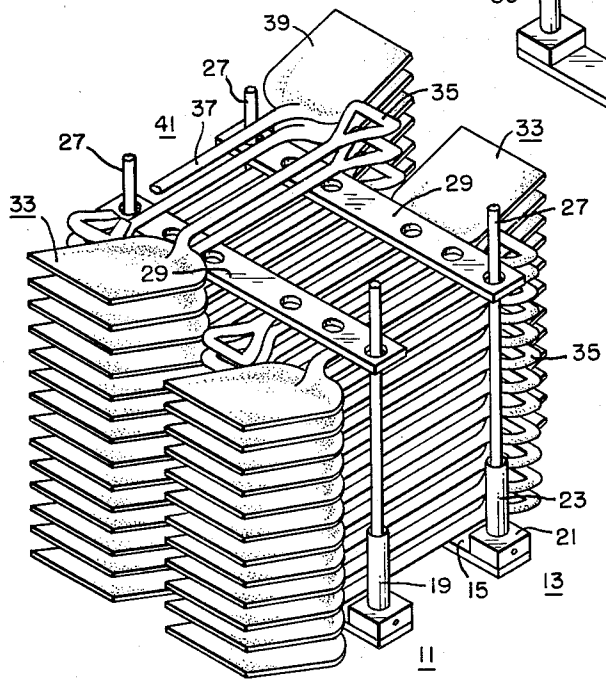


Fig. 3.

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3,208,606

STACKING APPARATUS

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1 Claim. (Cl. 214—10.5)

This invention relates to warehousing and shipping arts and has particular relationship to the stacking of material for warehousing or shipment.

It is the present practice to mass produce commodities and to store or stock these commodities until they are ready to be displayed for sale. The stacking takes place at several points in the distribution channels of each commodity and it is necessary to ship the material from one point to another. Typically the material may be stocked in the manufacturer's warehouse; then shipped to a wholesaler's warehouse where it is stored; then shipped to a retailer's warehouse whence it is taken to the retailer's outlet for display and sale.

This invention concerns itself with the storing of materials, each item of which may be of irregular contour but which is of extended area so that a number of items may be stacked in a block. Typical of such material are snow shovels, window screens, packages containing clothing, such as shirts, ties and the like, folding chairs and many other commodities. It is an object of this invention to provide apparatus for stacking such material in semi-permanent blocks which may be readily disassembled for sale or display yet maintain their form so that they may be stored economically and shipped from point to point as units.

The practice in accordance with the teachings of the prior art has been to pile items of such material in the warehouse in high stacks. The stacks in time collapse spreading the items over the floor of the warehouse thus taking up costly warehousing space. In closely packed warehouses the selection and removal of material to be removed is a major industrial task. The same practice is adopted in shipment in freight cars and trucks, except that for some commodities, freight cars are provided with complex retaining mechanisms. It is another object of this invention to provide storing apparatus which shall make economical use of warehouse and shipping space and which shall permit ready removal of selected materials.

It is an incidental object of this invention to provide a novel upright structure particularly suitable for use in the practice of this invention.

In accordance with this invention, the material is stacked in semi-permanent stacks which are held together by spacially adjustable pairs of vertical members. An elongated horizontal member extends from the vertical member of each pair and the horizontal members of each pair are coextensive so as to form a support for the stack at each end of the stack. The pairs of vertical members and their associated horizontal members are spaced to correspond to the length of the items so that the stack rests firmly on the horizontal members and is held together by the vertical members. To prevent spreading of the vertical members anti-spreading plates are mounted on the vertical members at or near the top of a stack. The vertical members extend above these plates and the plates may serve for stacking a second stack on the lower stack. Each stack may be labelled with the number of items which it contains for ease in taking or disposing of stock.

The novel features considered characteristic of this invention are described generally above. This invention, both as to its organization and as to its method of operation, together with its additional objects and advantages, will be better understood from the following description

of specific embodiments taken in connection with the accompanying drawings, in which:

FIGURE 1 is a view in perspective showing a preferred embodiment of this invention;

FIG. 2 is a view partly in perspective and partly in section showing a novel upright included in the embodiment shown in FIG. 1;

FIG. 3 is a view in perspective showing a stack of snow shovels produced in the practice of this invention; and

FIG. 4 is a view in perspective showing a modification of this invention.

The apparatus shown in the drawing includes separate spacially adjustable supporting structures **11** and **13**. Each structure includes a horizontal member **15**, which may be a strip or plate of wood, plastic, metal or other material, from the ends of which vertical members **17** and **19** extend.

Each vertical member includes a block **21** conveniently of wood or plastic into which a sleeve **23** is secured by a pin **25** which may be a long nail driven through the block and sleeve. The sleeve **23** may conveniently be of steel, aluminum or plastic. Each vertical member also includes a rod **27** of extended length which may slide fit in the sleeve **23** and telescopes into the sleeve resting on the pin **25**. The rod **27** may be hollow and may support additional rods (not shown), each of which telescopes into the one below so that the upright members **17** and **19** may have substantial length.

The apparatus also includes anti-spreading plates or strips **29** to prevent the spreading of the vertical members **17** and **19** of each structure **11** or **13** under the side pressure of the material being stored. Each plate **29** has holes **31** which are dimensioned so that the plates **29** may be slipped over the rods **27**. The material being stored exerts outward forces on the uprights **17** and **19** but these are prevented from spreading by the inward pull of the plates **29**. Each plate **29** may have a plurality of holes **31** so that it may be used with structures **11** and **13** in which the vertical members **17** and **19** are spaced different distances.

The use of the apparatus according to this invention is illustrated in FIG. 3 for stacking snow shovels **33**. The shovels are unusually awkward objects to stack but have been stacked successfully in the practice of this nivention.

To stack the shovels the supporting structures **11** and **13** are spaced so that the distance between them is equal to the distance along the handle between the junctions of the handgrip **35** and the supporting bar **37** on one side and the head **39** and the bar **37** on the other. The shovels **33** are then stacked in a block **41** with the base of the block on the horizontal members **15**. Adjacently positioned shovels may be reversed. The block is held as a semi-rigid unit by the vertical members **17** and **19**. When the block **41** is of reasonable height, the plates **29** are slipped on the rods **27** preventing spreading of the vertical members **17** and **19**. Another block of shovels **33** may be stacked with the plates **29** as supports and additional such plates may be slipped on the rods **27** to suppress spreading.

The apparatus according to this invention with the blocks assembled on it may be stored, moved, shipped or otherwise handled as a rigid unit.

FIG. 4 shows a modification of this invention in which the horizontal member **51** consists of two parts **53** and **55**, the part **53** dovetailing into **55**. Each part **53** and **55** carries a vertical member **57** and **59**. The modification shown in FIG. 4 permits ready adjustment of the distance between the vertical members **57** and **59**. Anti-spreader plates with differently spaced holes **31** may be used effectively in the modification shown in FIG. 4.

While preferred embodiments have been disclosed herein, many modifications thereof are feasible. In accordance with the broader aspects of this invention the anti-

spreading plates may be chains instead of plates **29**. Rubber strips could also be used. Where firm rigidity is demanded, as for shipment or movement, each block may include a number of anti-spreading mechanisms. For a highly rigid unit, there may be such a mechanism between adjacent layers.

An important advantage of this invention is that a number of blocks of material may be readily tiered vertically. For this purpose the portions of structures **11** and **13** including the plates **15**, the sleeves **23** and the blocks **25** may be inverted and the sleeves slipped over the ends of the posts **27** of a block such as is shown in FIG. 3. The inverted structures **11** and **13** provide support for a pallet or skid carrying a block of material stacked or tiered on a lower block.

Another important advantage of this invention is that the structures **11**, **13** and **29** may be readily disassembled and stored in a very small space. This contrasts with the space required by prior-art stackers.

This invention then is not to be restricted except insofar as is necessitated by the spirit of the prior art.

I claim as my invention:

Apparatus for storing a plurality of items of material of widely different geometric form, the properties and form of said material being unpredictable except that each item will have an extensive surface and a predetermined length so that said material may be stacked in vertical layers of said items, the said apparatus including a plurality of separate pairs of vertical members, each member of each pair extending from a generally elongated horizontal member, the horizontal members from which the vertical members of each pair extend adjustably interlacing to form a generally continuous horizontal supporting surface between the vertical members of each pair, and being movable into interlacing position with each other and out of such position, said pairs being disposed with their horizontal members generally parallel and said items being stacked on said horizontal members to form a stack, the spacing of said pairs being less than said length by a relatively small magnitude so that said stack rests firmly near each end of said stack on the horizontal members of one of said pairs, said stack being held together by the thrust of said vertical members against the walls of said stack, said horizontal and vertical members being unrelated in geometric form and composition to the material being stacked.

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